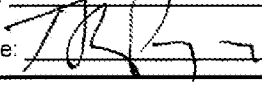


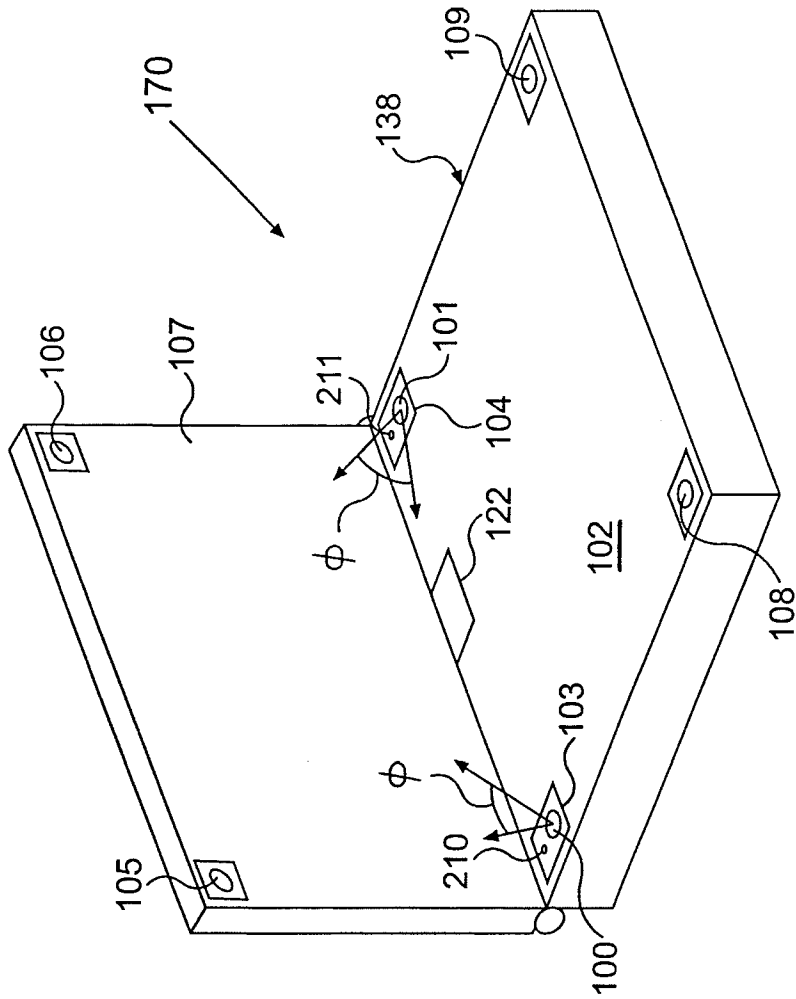
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## DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

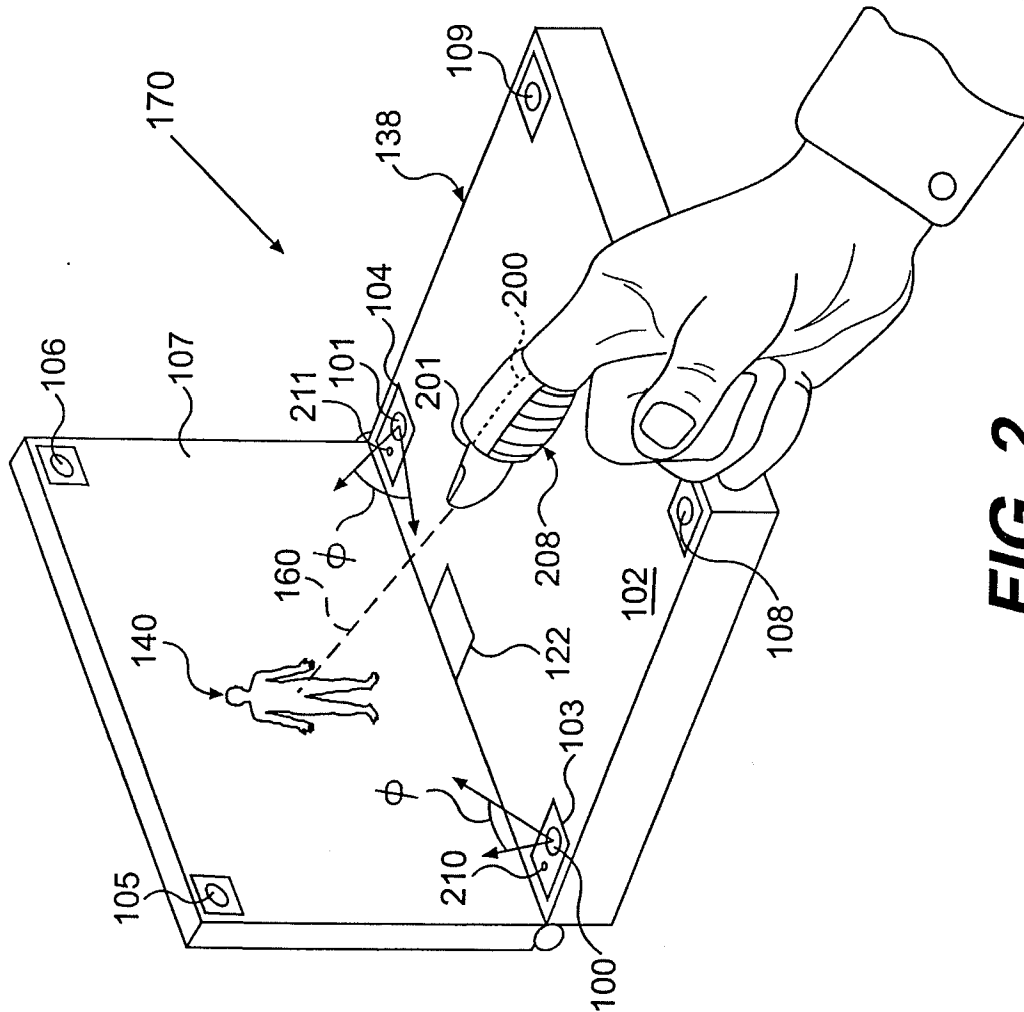
<b>Title of Invention</b>	<b>MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS</b>
<p>As the below named inventor, I hereby declare that:</p> <p>This declaration is directed to: <input checked="" type="checkbox"/> The attached application, or  <input type="checkbox"/> United States application or PCT international application number _____  filed on _____</p> <p>The above-identified application was made or authorized to be made by me.</p> <p>I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.</p> <p>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</p> <p style="text-align: center;"><b>WARNING:</b></p> <p>Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.</p>	
<p><b>LEGAL NAME OF INVENTOR</b></p> <p>Inventor: <u>Timothy R. Pryor</u> Date (Optional) <u>Dec 6, 2012</u></p> <p>Signature: <u></u></p>	
<p>Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.</p>	

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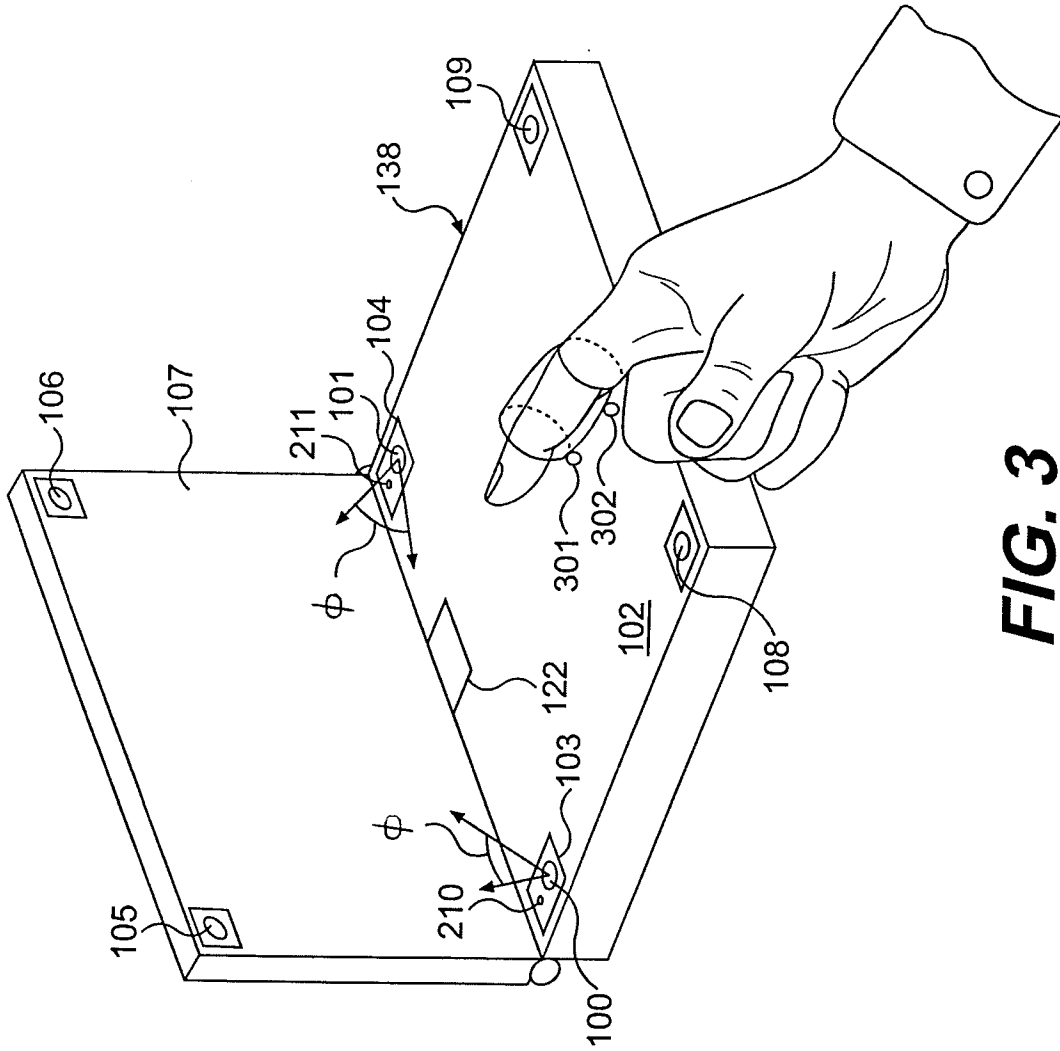
*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*



**FIG. 1**

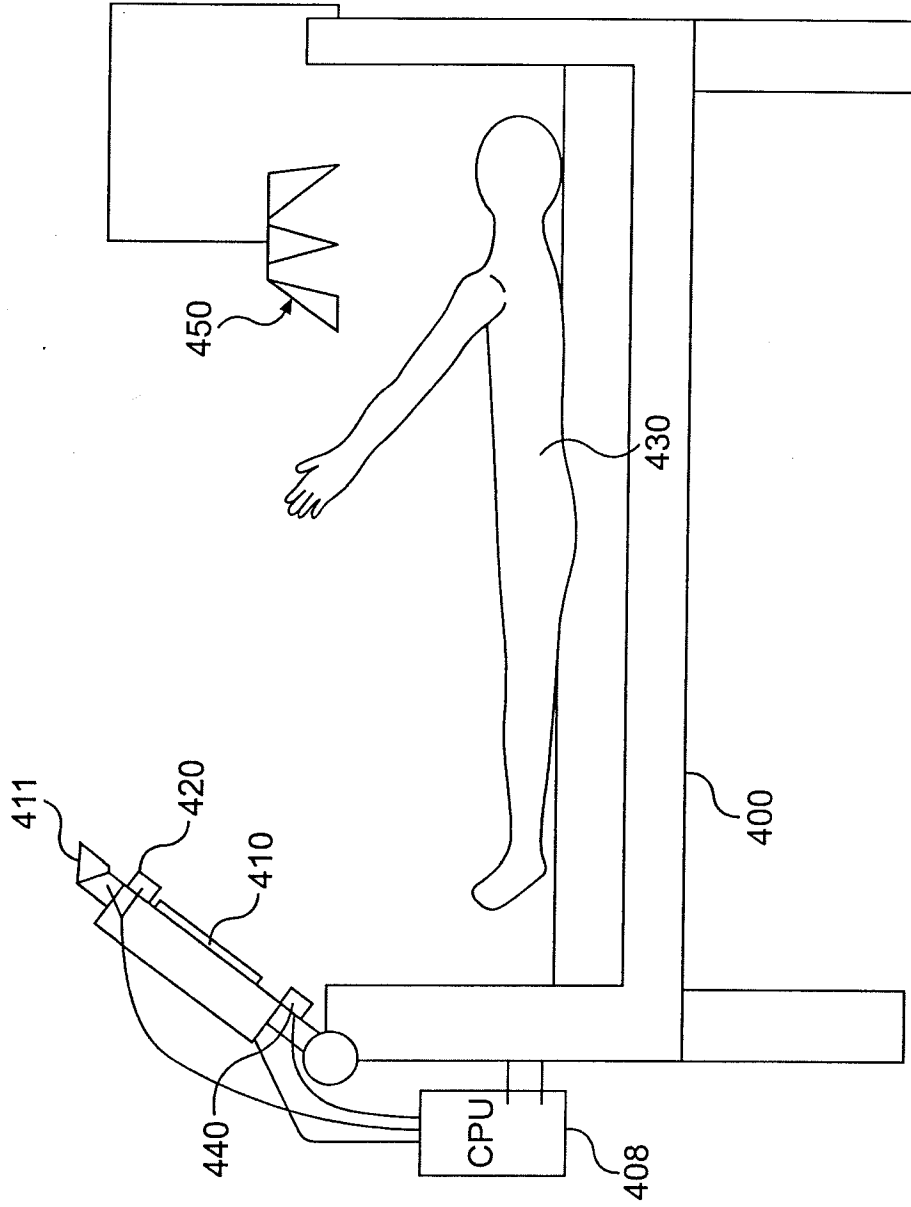


**FIG. 2**

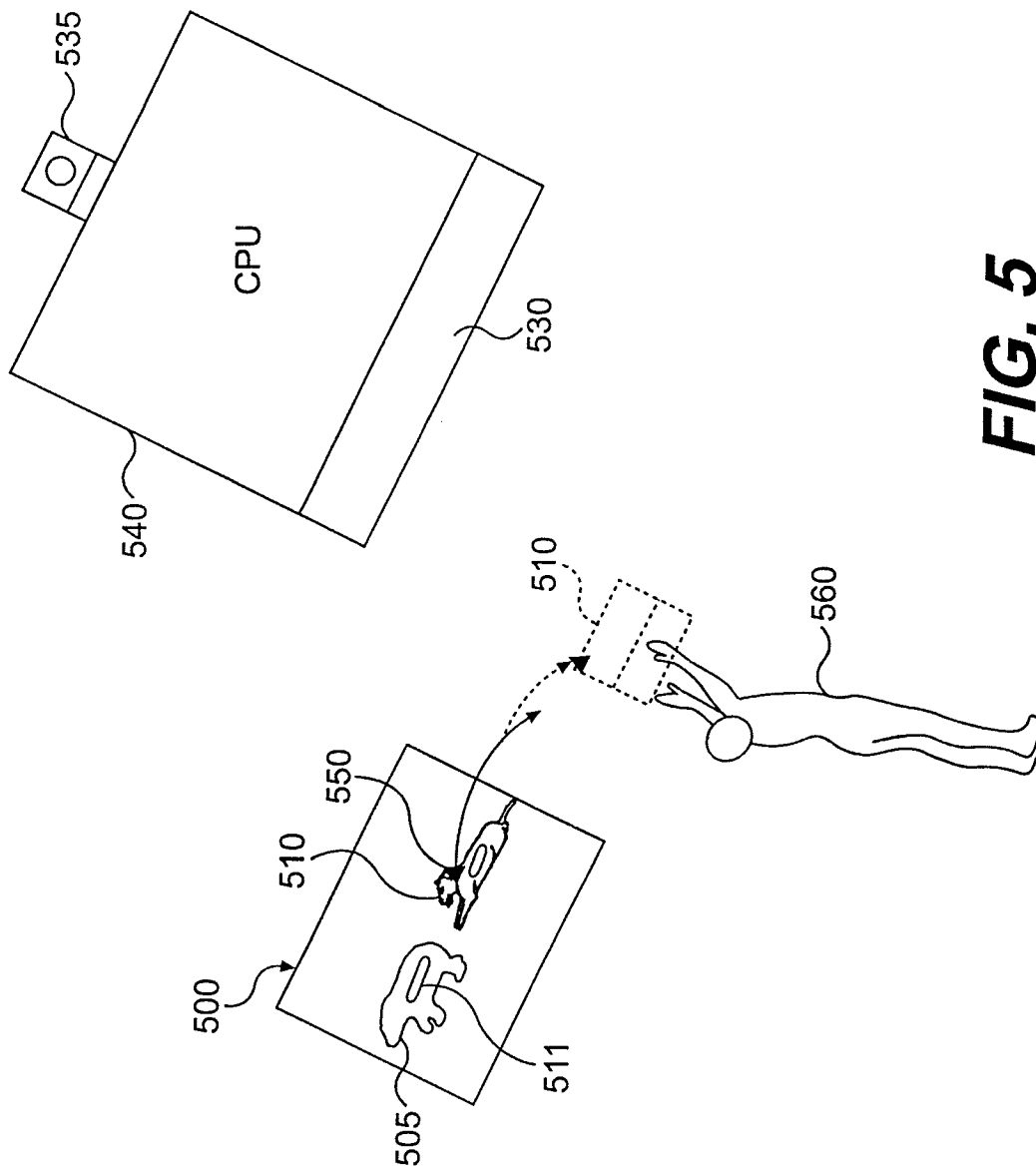


**FIG. 3**

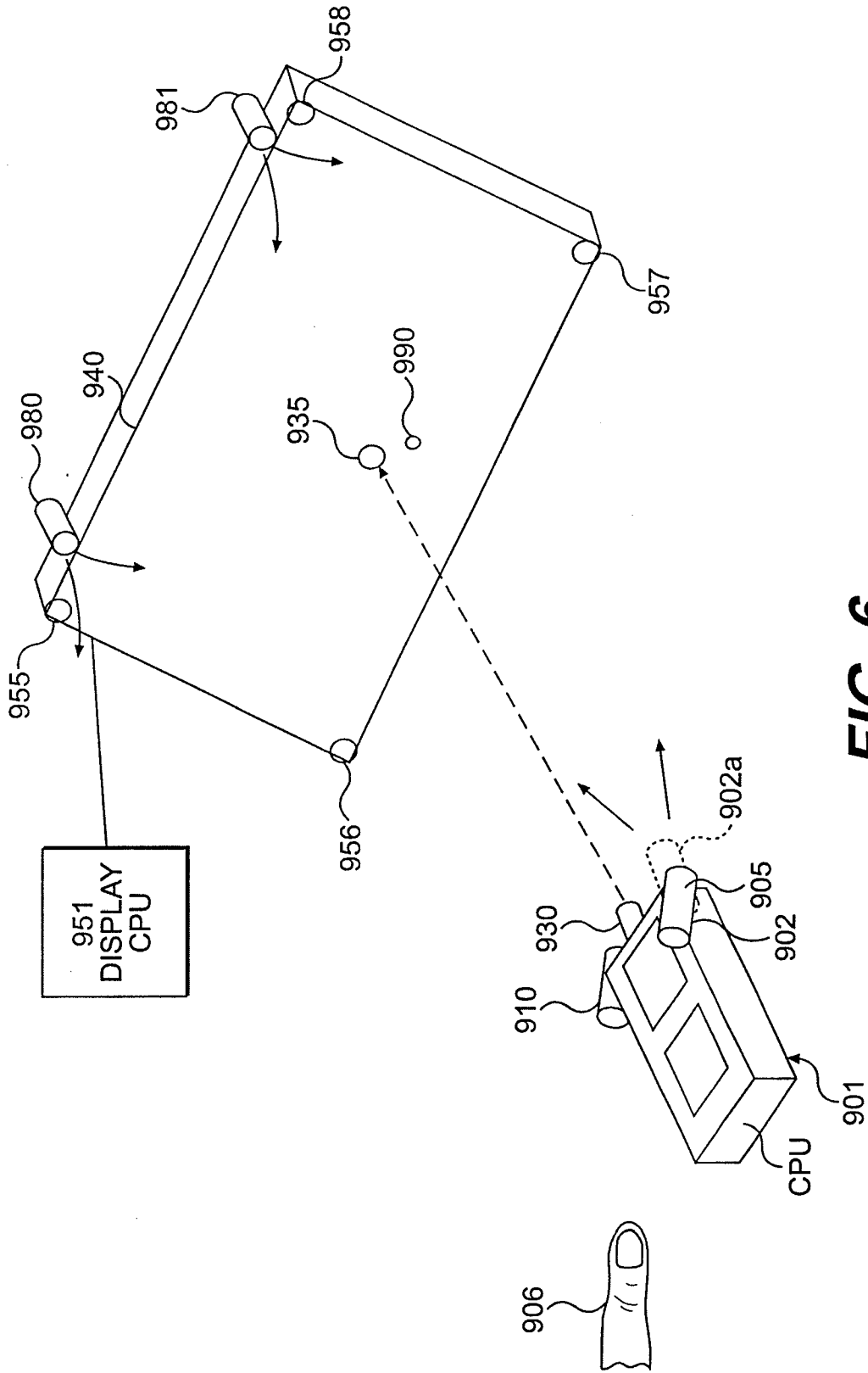




**FIG. 4**

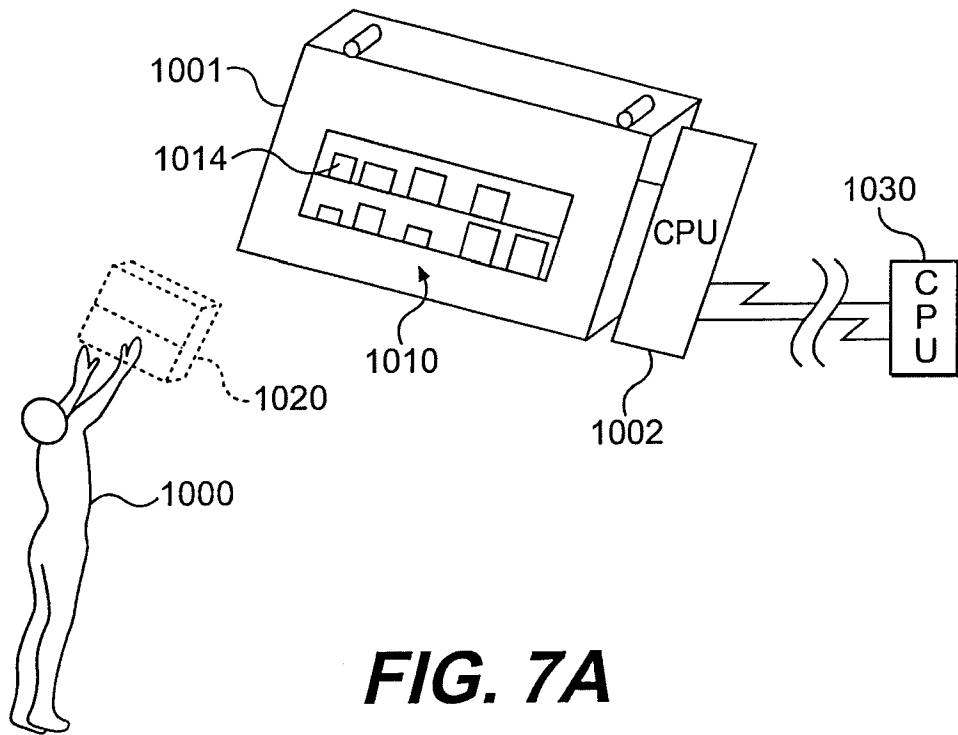


**FIG. 5**

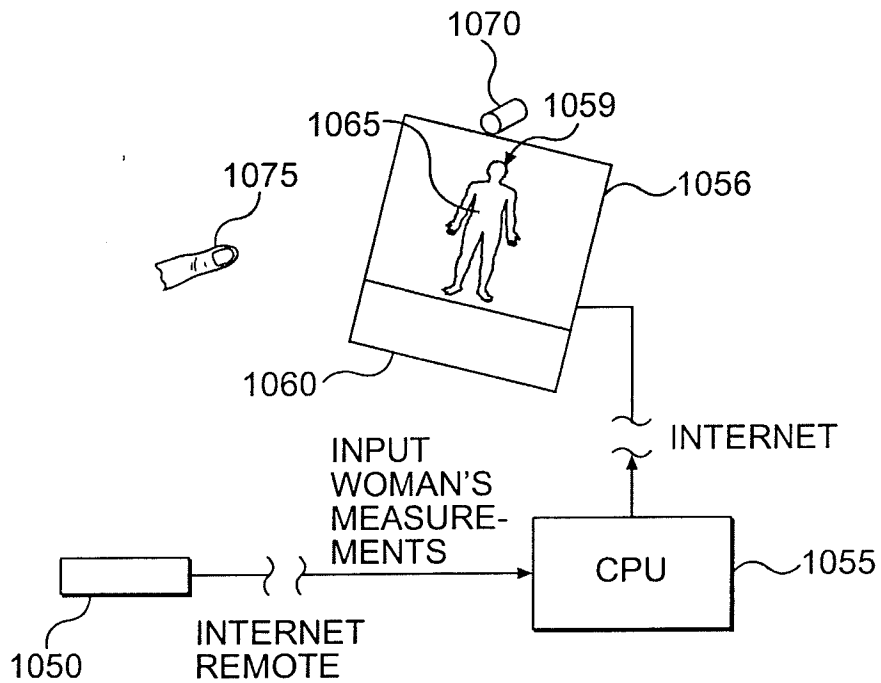


**FIG. 6**

717



**FIG. 7A**



**FIG. 7B**

MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 12/700,055, filed February 4, 2010 (now U.S. Patent \_\_\_\_\_), which is a continuation of U.S. Patent Application No. 10/866,191, filed June 14, 2004, which is a continuation of U.S. Patent Application No. 09/433,297, filed November 3, 1999 (now U.S. Patent 6,750,848), which claims benefit of U.S. Provisional Application No. 60/107,652, filed November 9, 1998. These applications are hereby incorporated by reference.

REFERENCES TO RELATED APPLICATIONS BY THE INVENTORS

- [0002] U.S. Patent Application No. 09/138,339, filed August 21, 1998.
- [0003] U.S. Provisional Application No. 60/056,639, filed August 22, 1997.
- [0004] U.S. Provisional Application No. 60/059,561, filed September 19, 1998.
- [0005] Man Machine Interfaces: SN 08/290,516, filed 8/15/1994, and now USP 6,008,800.
- [0006] Touch TV and Other Man Machine Interfaces: SN 08/496,908, filed 6/29/1995, and now USP 5,982,352.
- [0007] Systems for Occupant Position Sensing: SN 08/968,114, filed 11/12/1997, now abandoned, which claims benefit of 60/031,256, filed 11/12/1996.
- [0008] Target holes and corners: USSN 08/203,603, filed 2/28/1994, and 08/468,358 filed 6/6/1995, now USP 5,956,417 and USP 6,044, 183.
- [0009] Vision Target Based Assembly: USSN 08/469,429, filed 6/6/1995, now abandoned; 08/469,907, filed 6/6/1995, now USP 6,301,763; 08/470,325, filed 6/6/1995, now abandoned; and 08/466,294, filed 6/6/1995, now abandoned.

[00010] Picture Taking Method and Apparatus: Provisional Application no. 60/133,671, filed May 11, 1998.

[00011] Methods and Apparatus for Man Machine Interfaces and Related Activity: Provisional Application no. 60/133,673 filed May 11, 1998.

[00012] Camera Based Man-Machine Interfaces: Provisional Patent Application no. 60/142,777, filed July 8, 1999.

[00013] The copies of the disclosure of the above referenced applications are incorporated herein by reference.

### BACKGROUND OF THE INVENTION

[00014] Field of the Invention

[00015] The invention relates to simple input devices for computers, particularly, but not necessarily, intended for use with 3-D graphically intensive activities, and operating by optically sensing object or human positions and/or orientations. The invention in many preferred embodiments, uses real time stereo photogrammetry using single or multiple TV cameras whose output is analyzed and used as input to a personal computer, typically to gather data concerning the 3D location of parts of, or objects held by, a person or persons.

[00016] This continuation application seeks to provide further detail on useful embodiments for computing. One embodiment is a keyboard for a laptop computer (or stand alone keyboard for any computer) that incorporates digital TV cameras to look at points on, typically, the hand or the finger, or objects held in the hand of the user, which are used to input data to the computer. It may also or alternatively, look at the head of the user as well.

[00017] Both hands or multiple fingers of each hand, or an object in one hand and fingers of the other can be simultaneously observed, as can alternate arrangements as desired.

### DESCRIPTION OF RELATED ART

[00018] My referenced co-pending applications incorporated herein by reference discuss many prior art references in various pertinent fields, which form a background for this invention.

### BRIEF DESCRIPTION OF FIGURES

[00019] Fig. 1 illustrates a laptop or other computer keyboard with cameras according to the invention located on the keyboard surface to observe objects such as fingers and hands overhead of the keyboard.

[00020] Fig. 2 illustrates another keyboard embodiment using special datums or light sources such as LEDs.

[00021] Fig. 3 illustrates a further finger detection system for laptop or other computer input.

[00022] Fig. 4 illustrates learning, amusement, monitoring, and diagnostic methods and devices for the crib, playpen and the like.

[00023] Fig. 5 illustrates a puzzle toy for young children having cut out wood characters according to the invention.

[00024] Fig. 6 illustrates an improved handheld computer embodiment of the invention, in which the camera or cameras may be used to look at objects, screens and the like as well as look at the user along the lines of Fig. 1.

[00025] Fig. 7 illustrates new methods for internet commerce and other activities involving remote operation with 3D virtual objects display.

## DESCRIPTION OF THE INVENTION

### Figure 1

[00026] A laptop (or other) computer keyboard based embodiment is shown in Fig. 1. In this case, a stereo pair of cameras 100 and 101 located on each side of the keyboard are used, desirably having cover windows 103 and 104 mounted flush with the keyboard surface 102. The cameras are preferably pointed obliquely inward at angles  $\Phi$  toward the center of the desired work volume 170 above the keyboard. In the case of cameras mounted at the rear of the keyboard (toward the display screen), these cameras are also inclined to point toward the user at an angle as well.

[00027] Alternate camera locations may be used such as the positions of cameras 105 and 106, on upper corners of screen housing 107 looking down at the top of the fingers (or hands, or objects in hand or in front of the cameras), or of cameras 108 and 109 shown.

[00028] One of the referenced embodiments of the invention is to determine the pointing direction vector 160 of the user's finger (for example pointing at an object displayed on screen 107), or the position and orientation of an object held by the user. Alternatively, finger position data can be used to determine gestures such as pinch or grip, and other examples of relative juxtaposition of objects with respect to each other, as has been described in co-pending referenced applications. Positioning of an object or portions (such as hands or fingers of a doll) is also of use, though more for use with larger keyboards and displays.

[00029] In one embodiment, shown in Fig. 2, cameras such as 100/101 are used to simply look at the tip of a finger 201 (or thumb) of the user, or an object such as a ring 208 on the finger. Light from below, such as provided by single central light 122 can be used to illuminate the finger that typically looks bright under such illumination.



[00030] It is also noted that the illumination is directed or concentrated in an area where the finger is typically located such as in work volume 170. If the light is of sufficient spectral content, the natural flesh tone of the finger can be observed – and recognized by use of the color TV cameras 100/101.

[00031] As is typically the case, the region of the overlapping cameras viewing area is relatively isolated to the overlapping volumetric zone of their fields 170 shown due to focal lengths of their lenses and the angulation of the camera axes with respect to each other. This restricted overlap zone helps mitigate against unwanted matches in the two images due to information generated outside the zone of overlap. Thus there are no significant image matches found of other objects in the room, since the only flesh-toned object in the zone is typically the finger or fingers of the user. Or alternatively, for example, the user's hand or hands. Similarly objects or targets thereon can be distinguished by special colors or shapes.

[00032] If desired, or required, motion of the fingers can be also used to further distinguish their presence vis-a-vis any static background. If for example, by subtraction of successive camera frames, the image of a particular object is determined to have moved it is determined that this is likely the object of potential interest which can be further analyzed directly to determine if is the object of interest.

[00033] In case of obscuration of the fingers or objects in the hand, cameras in additional locations such as those mentioned above, can be used to solve for position if the view of one or more cameras is obscured.

[00034] The use of cameras mounted on both the screen and the keyboard allows one to deal with obscurations that may occur and certain objects may or may not be advantageously delineated in one view or the other.

[00035] In addition, it may be in many cases desirable to have a datum on the top of the finger as opposed to the bottom because on the bottom, it can get in the way of certain activities. In this case the sensors are required on the screen looking downward or in some other location such as off the computer entirely and located overhead has been noted in previous application.

[00036] To determine finger location, a front end processor like that described in the target holes and corners co-pending application reference incorporated USSN 08/203,603 and 08/468,358 can be used to also allow the finger shape as well as color to be detected.

[00037] Finger gestures comprising a sequence of finger movements can also be detected by analyzing sequential image sets such as the motion of the finger, or one finger with respect to another such as in pinching something can be determined. Cameras 100 and 101 have been shown at the rear of the keyboard near the screen or at the front. They may mount in the middle of the keyboard or any other advantageous location.

[00038] The cameras can also see one's fingers directly, to allow typing as now, but without the physical keys. One can type in space above the plane of the keyboard (or in this case plane of the cameras). This is useful for those applications where the keyboard of conventional style is too big (e.g., the hand held computer of Fig. 6).

[00039] Figure 2

[00040] It is also desirable for fast reliable operation to use retro-reflective materials and other materials to augment the contrast of objects used in the application. For example, a line target such as 200 can be worn on a finger 201, and advantageously can be located if desired between two joints of the finger as shown. This allows the tip of the finger to be used to type on the keyboard without feeling unusual – the case perhaps with target material on tip of the finger.

[00041] The line image detected by the camera can be provided also by a cylinder such as retroreflective cylinder 208 worn on the finger 201 which effectively becomes a line image in the field of view of each camera (assuming each camera is equipped with a sufficiently coaxial light source, typically one or more LEDs such as 210 and 211), can be used to solve easily using the line image pairs with the stereo cameras for the pointing direction of the finger that is often a desired result. The line, in the stereo pair of images provides the pointing direction of the finger, for example pointing at an object displayed on the screen 140 of the laptop computer 138.

[00042] Figure 3

[00043] It is also possible to have light sources on the finger that can be utilized such as the 2 LED light sources shown in Fig. 3. This can be used with either TV camera type sensors or with PSD type analog image position sensors as disclosed in references incorporated.

[00044] In particular the ring mounted LED light sources 301 and 302 can be modulated at different frequencies that can be individually discerned by sensors imaging the sources on to a respective PSD detector. Alternatively, the sources can simply be turned on and off at different times such that the position of each point can be independently found allowing the pointing direction to be calculated from the LED point data gathered by the stereo pair of PSD based sensors.

[00045] The “natural interface keyboard” here described can have cameras or other sensors located at the rear looking obliquely outward toward the front as well as inward so as to have their working volume overlap in the middle of the keyboard such as the nearly full volume over the keyboard area is accommodated.

[00046] Clearly larger keyboards can have a larger working volume than one might have on a laptop. The pair of sensors used can be augmented with other sensors mounted on the screen

housing. It is noted that the linked dimension afforded for calibration between the sensors located on the screen and those on the keyboard is provided by the laptop unitary construction.

[00047] One can use angle sensing means such as a rotary encoder for the laptop screen tilt. Alternatively, cameras located on the screen can be used to image reference points on the keyboard as reference points to achieve this. This allows the calibration of the sensors mounted fixedly with respect to the screen with respect to the sensors and keyboard space below. It also allows one to use stereo pairs of sensors that are not in the horizontal direction (such as 101/102) but could for example be a camera sensor such as 100 on the keyboard coupled with one on the screen, such as 106.

[00048] Knowing the pointing angles of the two cameras with respect to one another allows one to solve for the 3D location of objects from the matching of the object image positions in the respective camera fields.

[00049] As noted previously, it is also of interest to locate a line or cylinder type target on the finger between the first and second joints. This allows one to use the fingertip for the keyboard activity but by raising the finger up, it can be used as a line target capable of solving for the pointed direction for example.

[00050] Alternatively one can use two point targets on the finger such as either retroreflective datums, colored datums such as rings or LED light sources that can also be used with PSD detectors which has also been noted in Fig. 2.

[00051] When using the cameras located for the purpose of stereo determination of the position of the fingers from their flesh tone images it is useful to follow the preprocessing capable of processing data obtained from the cameras in order to look for the finger. This can be done on both color basis and on the basis of shape as well as motion.

[00052] In this invention, I have shown the use of not only cameras located on a screen looking downward or outward from the screen, but also cameras that can be used instead of or in combination with those on the screen placed essentially on the member on which the keyboard is incorporated. This allows essentially the keyboard to mounted cameras which are preferably mounted flush with the keyboard surface to be unobtrusive, and yet visually be able to see the users fingers, hands or objects held by the user and in some cases, the face of the user.

[00053] This arrangement is also useful for 3D displays, for example where special synchronized glasses (e.g., the “Crystal Eyes” brand often used with Silicon Graphics work stations) are used to alternatively present right and left images to each eye. In this case the object may appear to be actually in the workspace 170 above the keyboard, and it may be manipulated by virtually grasping (pushing, pulling, etc.) it, as has been described in co-pending applications.

[00054] Figure 4: Baby Learning and Monitoring System

[00055] A baby’s reaction to the mother (or father) and the mother’s analysis of the baby’s reaction is very important. There are many gestures of babies apparently indicated in child psychology as being quite indicative of various needs, wants, or feelings and emotions, etc. These gestures are typically made with the baby’s hands.

[00056] Today this is done and learned entirely by the mother being with the baby. However with an Electro-optical sensor based computer system, such as that described in co-pending applications located proximate to or even in the crib (for example), one can have the child’s reactions recorded, not just in the sense of a video tape which would be too long and involved for most to use, but also in terms of the actual motions which could be computer recorded and analyzed also with the help of the mother as to what the baby’s responses were.

And such motions, combined with other audio and visual data can be very important to the baby's health, safety, and learning.

[00057] Consider for example crib 400 with computer 408 having LCD monitor 410 and speaker 411 and camera system (single or stereo) 420 as shown, able to amuse or inform baby 430, while at the same time recording (both visually, aurally, and in movement detected position data concerning parts of his body or objects such as rattles in his hand) his responses for any or all of the purposes of diagnosis of his state of being, remote transmission of his state, cues to various programs or images to display to him or broadcast to others, or the like.

[00058] For one example, baby's motions could be used to signal a response from the TV either in the absence of the mother or with the mother watching on a remote channel. This can even be over the Internet if the mother is at work.

[00059] For example, a comforting message could come up on the TV from the mother that could be prerecorded (or alternatively could actually be live with TV cameras in the mother's or father's workplace for example on a computer used by the parent) to tell the baby something reassuring or comfort the baby or whatever. Indeed the parent can be monitored using the invention and indicate something back or even control a teleoperator robotic device to give a small child something to eat or drink for example. The same applies to a disabled person.

[00060] If the father or mother came up on the screen, the baby could wave at it, move its head or "talk" to it but the hand gestures may be the most important.

[00061] If the mother knows what the baby is after, she can talk to baby or say something, or show something that the baby recognizes such as a doll. After a while, looking at this live one can then move to talking to the baby from some prerecorded data.

[00062]       What other things might we suppose? The baby for example knows to puts its hand on the mother's cheek to cause the mother to turn to it. The baby also learns some other reflexes when it is very young that it forgets when it gets older. Many of these reflexes are hand movements, and are important in communicating with the remote TV based mother representation, whether real via telepresence or from CD Rom or DVD disk (or other media, including information transmitted to the computer from afar) and for the learning of the baby's actions.

[00063]       Certainly just from the making the baby feel good point-of-view, it would seem like certain motherly (or fatherly, etc.) responses to certain baby actions in the form of words and images would be useful. This stops short of physical holding of the baby which is often needed, but could act as a stop gap to allow the parents to get another hour's sleep for example.

[00064]       As far as the baby touching things, I've discussed in other applications methods for realistic touch combined with images. This leads to a new form of touching crib mobiles that could contain video imaged and or be imaged themselves – plus if desired – touched in ways that would be far beyond any response that you could get from a normal mobile.

[00065]       For example, let us say there is a targeted (or otherwise TV observable) mobile 450 in the crib above the baby. Baby reaches up and touches a piece of the mobile which is sensed by the TV camera system (either from the baby's hand position, the mobile movement, or both, and a certain sound is called up by the computer, a musical note for example. Another piece of the mobile and another musical note. The mobile becomes a musical instrument for the baby that could play either notes or chords or complete passages, or any other desired programmed function.

[00066] The baby can also signal things. The baby can signal using agitated movements would often mean that it's unhappy. This could be interpreted using learned movement signatures and artificial intelligence as needed by the computer to call for mother even if the baby wasn't crying. If the baby cries, that can be picked up by microphone 440, recognized using a voice recognition system along the lines of that used in IBM Via Voice commercial product for example. And even the degree of crying can be analyzed to determine appropriate action.

[00067] The computer could also be used to transmit information of this sort via the internet email to the mother who could even be at work. And until help arrives in the form of mother intervention or whatever, the computer could access a program that could display on a screen for the baby things that the baby likes and could try to soothe the baby through either images of familiar things, music or whatever. This could be useful at night when parents need sleep, and anything that would make the baby feel more comfortable would help the parents.

[00068] It could also be used to allow the baby to input to the device. For example, if the baby was hungry, a picture of the bottle could be brought up on the screen. The baby then could yell for the bottle. Or if the baby needed his diaper changed, perhaps something reminiscent of that. If the baby reacts to such suggestions of his problem, this gives a lot more intelligence as to why he is crying and while mothers can generally tell right away, not everyone else can. In other words, this is pretty neat for babysitters and other members of the household so they can act more intelligently on the signals the baby is providing.

[00069] Besides in the crib, the system as described can be used in conjunction with a playpen, hi-chair or other place of baby activity.

[00070] As the child gets older, the invention can further be used also with more advanced activity with toys, and to take data from toy positions as well. For example, blocks, dolls, little



cars, and moving toys even such as trikes, scooters, drivable toy cars and bikes with training wheels.

[00071] The following figure illustrates the ability of the invention to learn, and thus to assist in the creation of toys and other things.

[00072] Figure 5: Learning Puzzle Roy

[00073] Disclosed in Fig. 5 is a puzzle toy 500 where woodcut animals such as bear 505 and lion 510 are pulled out with handle such as 511. The child can show the animal to the camera and a computer 530 with TV camera (or cameras) 535 can recognize the shape as the animal, and provide a suitable image and sounds on screen 540.

[00074] Alternatively, and more simply, a target, or targets on the back of the animal can be used such as triangle 550 on the back of lion 511. In either case the camera can solve for the 3D, and even 5 or 6D position and orientation of the animal object, and cause it to move accordingly on the screen as the child maneuvers it. The child can hold two animals, one in each hand and they can each be detected, even with a single camera, and be programmed in software to interact as the child wishes (or as he learns the program).

[00075] This is clearly for very young children of two or three years of age. The toys have to be large so they can't be swallowed.

[00076] With the invention in this manner, one can make a toy of virtually anything, for example a block. Just hold this block up, teach the computer/camera system the object and play using any program you might want to represent it and its actions. To make this block known to the system, the shape of the block, the color of the block or some code on the block can be determined. Any of those items could tell the camera which block it was, and most could give position and orientation if known.

[00077] At that point, an image is called up from the computer representing that particular animal or whatever else the block is supposed to represent. Of course this can be changed in the computer to be a variety of things if this is something that is acceptable to the child. It could certainly be changed in size such as a small lion could grow into a large lion. The child could probably absorb that more than a lion changing into a giraffe for example since the block wouldn't correspond to that. The child can program or teach the system any of his blocks to be the animal he wants and that might be fun.

[00078] For example, he or the child's parent could program a square to be a giraffe where as a triangle would be a lion. Maybe this could be an interesting way to get the child to learn his geometric shapes!

[00079] Now the basic block held up in front of the camera system could be looked at just for what it is. As the child may move the thing toward or away from the camera system, one may get a rough sense of depth from the change in shape of the object. However this is not so easy as the object changes in shape due to any sort of rotations.

[00080] Particularly interesting then is to also sense the rotations if the object so that the animal can actually move realistically in 3 Dimensions on the screen. And perhaps having the de-tuning of the shape of the movement so that the child's relatively jerky movements would not appear jerky on the screen or would not look so accentuated. Conversely of course, you can go the other way and accentuate the motions.

[00081] This can, for example, be done with a line target around the edge of the object is often useful for providing position or orientation information to the TV camera based analysis software, and in making the object easier to see in reflective illumination.

[00082]        Aid to speech recognition

[00083]        The previous co-pending application entitled “Useful man machine interfaces and applications” referenced above, discussed the use of persons movements or positions to aid in recognizing the voice spoken by the person.

[00084]        In one instance, this can be achieved by simply using ones hand to indicate to the camera system of the computer that the voice recognition should start (or stop, or any other function, such as a paragraph or sentence end, etc.).

[00085]        Another example is to use the camera system of the invention to determine the location of the persons head (or other part), from which one can instruct a computer to preferentially evaluate the sound field in phase and amplitude of two or more spaced microphones to listen from that location – thus aiding the pickup of speech – which often times is not able to be heard well enough for computer based automatic speech recognition to occur.

[00086]        Digital interactive TV

[00087]        As you watch TV, data can be taken from the camera system of the invention and transmitted back to the source of programming. This could include voting on a given proposition by raising your hand for example, with your hand indication transmitted. Or you could hold up 3 fingers, and the count of fingers transmitted. Or in a more extreme case, your position, or the position of an object or portion thereof could be transmitted – for example you could buy a coded object – whose code would be transmitted to indicate that you personally (having been pre-registered) had transmitted a certain packet of data.

[00088]        If the programming source can transmit individually to you (not possible today, but forecast for the future), then much more is possible. The actual image and voice can respond

using the invention to positions and orientations of persons or objects in the room – just as in the case of prerecorded data – or one to one internet connections. This allows group activity as well.

[00089] In the extreme case, full video is transmitted in both directions and total interaction of users and programming sources and each other becomes possible.

[00090] An interim possibility using the invention is to have a program broadcast to many, which shifts to prerecorded DVD disc or the like driving a local image, say when your hand input causes a signal to be activated.

[00091] Handwriting authentication

[00092] A referenced co-pending application illustrated the use of the invention to track the position of a pencil in three dimensional space such that the point at which the user intends the writing point to be at, can be identified and therefore used to input information, such as the intended script.

[00093] As herein disclosed, this part of the invention can also be used for the purpose of determining whether or not a given person's handwriting or signature is correct.

[00094] For example, consider authentication of an Internet commercial transaction. In this case, the user simply writes his name or address and the invention is used to look at the movements of his writing instrument and determine from that whether or not the signature is authentic. (A movement of one or more of his body parts might also or alternatively be employed). For example a series of frames of datum location on his pen can be taken, to determine one or more positions on it as a function of time, even to include calculating of its pointing direction, from a determined knowledge in three axes of two points along the line of the pen axis. In this case a particular pointing vector sequence "signature" would be learned for this person, and compared to later signatures.

[00095] What is anticipated here is that in order to add what you might call the confirming degree of authenticity to the signature, it may not be necessary to track the signature completely. Rather one might only determine that certain aspects of the movement of the pencil are the authentic ones. One could have people write using any kind of movement, not just their signature having their name. The fact is that people are mostly used to writing their name and it would be assumed that that would be it. However, it could well be that the computer asks the user to write something else that they would then write and that particular thing would be stored in the memory.

[00096] Optionally, one's voice could be recognized in conjunction with the motion signature to add further confirmation.

[00097] This type of ability for the computer system at the other end of the Internet to query a writer to write a specific thing in a random fashion adds a degree of cryptographic capacity to the invention. In other words, if I can store the movements in my hand to write different things, then clearly this has some value.

[00098] The important thing though is that some sort of representation of the movements of the pencil or other instrument can be detected using the invention and transmitted.

[00099] Figure 6: Hand Held Computer

[000100] Fig. 6 illustrates an improved handheld computer embodiment of the invention. For example, Fig. 8 of the provisional application referenced above entitled "camera based man machine interfaces and applications" illustrates a basic hand held device and which is a phone, or a computer or a combination thereof, or alternatively to being hand held, can be a wearable computer for example on one's wrist.

[000101] In this embodiment, we further disclose the use of this device as a computer, with a major improvement being the incorporation of a camera of the device optionally in a position to look at the user, or an object held by the user- along the lines of Fig. 1 of the instant disclosure for example.

[000102] Consider hand held computer 901 of Fig. 6, incorporating a camera 902 which can optionally be rotated about axis 905 so as to look at the user or a portion thereof such as finger 906, or at objects at which it is pointed. Optionally, and often desirably, a stereo pair of cameras to further include camera 910 can also be used. It too may rotate, as desired. Alternatively fixed cameras can be used as in Fig. 1, and Fig. 8 of the referenced co-pending application, when physical rotation is not desired, for ruggedness, ease of use, or other reasons (noting that fixed cameras have fixed fields of view, which limit versatility in some cases).

[000103] When aimed at the user, as shown, it can be used, for example, to view and obtain images of:

[000104] Ones self-facial expression etc., also for image reasons, id etc., combined effect.

[000105] Ones fingers (any or all), one finger to other and the like. This in turn allows conversing with the computer in a form of sign language which can replace the keyboard of a conventional computer.

[000106] One or more pbjects in one's hand. Includes a pencil or pen, and thus can be used rather than having a special touch screen and pencil if the pencil itself is tracked as disclosed in the above figure. It also allows small children to use the device, and those who cannot hold an ordinary stylus.

[000107] One's gestures.

[000108] The camera 902 (and 910 if used, and if desired), can also be optionally rotated and used to viewpoints in space ahead of the device, as shown in dotted lines 902a. In this position for example it can be used for the purposes described in the previous application. It can also be used to observe or point at (using optional laser pointer 930) points such as 935 on a wall, or a mounted LCD or projection display such as 940 on a wall or elsewhere such as on the back of an airline seat.

[000109] With this feature of the invention, there is no requirement to carry a computer display with you as with a infrared connection (not shown) such as known in the art one can also transmit all normal control information to the display control computer 951. As displays become ubiquitous, this makes increasing sense - otherwise the displays get bigger the computers smaller trend doesn't make sense if they need to be dragged around together. As one walks into a room, one uses the display or displays in that room (which might themselves be interconnected).

[000110] The camera unit 902 can sense the location of the display in space relative to the handheld computer, using for example the four points 955-958 on the corners of the display as references. This allows the handheld device to become an accurate pointer for objects displayed on the screen, including control icons. And it allows the objects on the screen to be sensed directly by the camera- if one does not have the capability to spatially synchronize and coordinate the display driver with the handheld computer.

[000111] The camera can also be used to see gestures of others, as well as the user, and to acquire raw video images of objects in its field.

[000112] A reverse situation also exists where the cameras can be on the wall mounted display, such as cameras 980 and 981 can be used to look at the handheld computer module 901 and determine its position and orientation relative to the display.

[000113] Note that a camera such as 902, looking at you the user, if attached to hand held unit, always has reference frame of that unit. If one works with a screen on a wall, one can aim the handheld unit with camera at it, and determine its reference frame to the handheld unit. Also can have two cameras operating together, one looking at wall thing, other at you (as 902 and 902a) in this manner, one can dynamically compare ref frames of the display to the human input means in determining display parameters. This can be done in real time, and if so one can actually wave the handheld unit around while still inputting accurate data to the display using ones fingers, objects or whatever.

[000114] Use of a laser pointer such as 930 incorporated into the handheld unit has also been disclosed in the referenced co-pending applications. For example, a camera on the hand held computer unit such as 902 viewing in direction 902a would look at laser spot such as 990 (which might or might not have come from the computers own laser pointer 930) on the wall display say, and recognized by color and size/shape reference to edge of screen, and to projected spots on screen.

[000115] Figure 7: Internet and Other Remote Applications

[000116] Fig. 7A illustrates new methods for internet commerce and other activities involving remote operation with 3D virtual objects displayed on a screen. This application also illustrates the ability of the invention to prevent computer vision eye strain.

[000117] Let us first consider the operation of the invention over the internet as it exists today in highly bandwidth limited form dependent on ordinary phone lines for the most part. In this case it is highly desirable to transmit just the locations or pointing vectors of portions (typically determined by stereo photo-grammetry of the invention) of human users or objects



associated therewith to a remote location, to allow the remote computer 10 to modify the image or sound transmitted back to the user.

[000118] Another issue is the internet time delay, which can exist in varying degrees, and is more noticeable, the higher resolution of the imagery transmitted. In this case, a preferred arrangement is to have real time transmission of minimal position and vector data (using no more bandwidth than voice), and to transmit back to the user, quasi stationary images at good resolution. Transmission of low resolution near real time images common in internet telephony today, does not convey the natural feeling desired for many commercial applications to now be discussed. As bandwidth becomes more plentiful these restrictions are eased.

[000119] Let us consider the problem posed of getting information from the internet of today. A user 1000 can go to a virtual library displayed on screen 1001 controlled by computer 1002 where one sees a group 1010 of books on stacks. Using the invention as described herein and incorporated referenced applications to determine my hand and finger locations, I the user, can point at a book such as 1014 in a computer sensed manner, or even reach out and “grab” a book, such as 1020 (dotted lines) apparently generated in 3D in front of me.

[000120] My pointing, or my reach and grab is in real time, and the vector (such as the pointing direction of ones finger at the book on the screen, or the position and orientation closing vectors of one’s forefinger and thumb to grab the 3D image 1020 of the book) indicating the book in question created is transmitted back by internet means to the remote computer 1030 which determines that I have grabbed the book entitled War and Peace from the virtual shelf. A picture of the book coming off the shelf is then generated using fast 3D graphical imagery such as the Merlin VR package available today from Digital Immersion company of Sudbury, Ontario. This picture (and the original picture of the books on the shelves) can be retransmitted

over the internet at low resolution (but sufficient speed) to give a feeling of immediacy to the user. Or alternatively, the imagery can be generated locally at higher resolution using the software package resident in the local computer 1002 which receives key commands from the distant computer 1030.

[000121] After the book has been “received” by the user, it then can be opened automatically to the cover page for example under control of the computer, or the users 10 hands can pretend to open it, and the sensed hands instruct the remote (or local, depending on version) computer to do so. A surrogate book such as 1040 can also be used to give the user a tactile feel of a book, even though the real book in questions pages will be viewed on the display screen 1001. One difference to this could be if the screen 1001 depicting the books were life size, like real stacks. Then one might wish to go over to a surrogate book incorporating a separate display screen- just as one would in a real library, go to a reading table after removing a book from a stack.

[000122] Net Grocery stores have already appeared, and similar applications concern picking groceries off of the shelf of a virtual supermarket, and filling ones shopping cart. For that matter, any store where it is desired to show the merchandise in the very manner people are accustomed to seeing it, namely on shelves or racks, generally as one walks down an aisle, or fumbles through a rack of clothes for example. In each case, the invention, which also can optionally use voice input, as if to talk to a clothing sales person, can be used to monitor the person’s positions and gestures.

[000123] The invention in this mode can also be used to allow one to peruse much larger objects. For example, to buy a car (or walk through a house, say) over the internet, one can lift the hood, look inside, etc., all by using the invention to monitor the 3D position of your head or

hands and move the image of the car presented accordingly. If the image is presented substantially life-size, then one can be monitored as one physically walks around the car in one's room say, with the image changing accordingly. In other words just as today.

[000124] Note that while the image can be apparently life-size using virtual reality glasses, the natural movements one is accustomed to in buying a car are not present. This invention makes such a natural situation possible (though it can also be used with such glasses as well).

[000125] It is noted that the invention also comprehends adding a force based function to a feedback to your hands, such that it feels like you lifted the hood, or grabbed the book, say. For this purpose holding a surrogate object as described in co-pending applications could be useful, in this case providing force feedback to the object.

[000126] If one looks at internet commerce today, some big applications have turned out to be clothes and books. Clothes are by far the largest expenditure item, and let's look closer at this.

[000127] Consider too a virtual mannequin, which can also have measurements of a remote shopper. For example, consider diagram 78, where a woman's measurements are inputted by known means such as a keyboard 1050 over the internet to a CAD program in computer 1055, which creates on display screen 1056 a 3D representation of a mannequin 1059 having the woman's shape in the home computer 1060 . As she selects a dress 1065 to try on, the dress which let's say comes in 10 sizes, 5 to 15, is virtually "tried on" the virtual mannequin and the woman 1070 looks at the screen 1056 and determines the fit of a standard size 12 dress. She can rapidly select larger or smaller sizes and decide which she thinks looks and/or fits better.

[000128] Optionally, she can signal to the computer to rotate the image in any direction, and can look at it from different angles up or down as well, simply doing a rotation in the

computer. This signaling can be conventional using for example a mouse, or can be using TV based sensing aspects of the invention such as employing camera 1070 also as shown in Fig. 1 for example. In another such case, she can reach out with her finger 1075 for example, and push or pull in a virtual manner the material, using the camera to sense the direction of her finger. Or she can touch herself at the points where the material should be taken up or let out, with the camera system sensing the locations of touch (typically requiring at least a stereo pair of cameras or other electro-optical system capable of determining where her fingertip is in 3D space. Note that a surrogate for the tried on dress in this case, could be the dress she has on, which is touched in the location desired on the displayed dress.

[000129] The standard size dress can then be altered and shipped to her, or the requisite modifications can be made in the CAD program, and a special dress cut out and sewed which would fit better.

[000130] A person can also use her hands via the TV cameras of the invention to determine hand location relative to the display to take clothes off a virtual manikin which could have a representation of any person real or imaginary. Alternatively she can remotely reach out using the invention to a virtual rack of clothes such as 1090, take an object off the rack, and put it on the manikin. This is particularly natural in near life-size representation, just like being in a store or other venue. This ability of the invention to bring real life experience to computer shopping and other activity that is a major advantage.

[000131] The user can also feel the texture of the cloth if suitable haptic devices are 15 available to the user, which can be activated remotely by the virtual clothing program, or other type of program.

[000132] Modifications of the invention herein disclosed will occur to persons skilled in the art, and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

## CLAIMS

1. A computer apparatus comprising:  
a laptop housing including an upper portion and a lower portion, the upper portion including a display and the lower portion including a keyboard;  
first and second digital cameras supported by the lower portion housing and having overlapping fields of view in the region above the keyboard, the digital cameras providing respective first and second outputs; and  
a processing unit operatively coupled to the first and second outputs, wherein the processing unit is adapted to determine a gesture performed in the overlapping fields of view and is further adapted to correlate the gesture with a computer input function.
2. The computer apparatus of claim 1 wherein the first and second digital cameras are positioned laterally outward of the keyboard.
3. The computer apparatus of claim 1 wherein the processing unit is adapted to compare successive outputs of the first and second cameras to determine the gesture.
4. The computer apparatus of claim 1 wherein the determined gesture includes a pinch gesture.
5. The computer apparatus of claim 1 wherein the determined gesture includes a pointing gesture.
6. The computer apparatus of claim 1 wherein the determined gesture includes a grip gesture.
7. The computer apparatus of claim 1 wherein the upper portion is hinged relative to the lower portion.
8. A computer implemented method comprising:

providing a plurality of keys and first and second digital cameras in fixed relation relative to the plurality of keys, the first and second digital cameras including overlapping fields of view in the region above the plurality of keys;

detecting a gesture performed in the overlapping fields of view by comparing successive outputs of the first and second digital cameras, the gesture being performed by at least one of a user's hand and a user's fingers; and

correlating the detected gesture with a computer input function, wherein the computer input function is one of a plurality of computer input functions stored in computer readable memory.

9. The method according to claim 8 wherein the detected gesture includes a pinch gesture.

10. The method according to claim 8 wherein the detected gesture includes a pointing gesture.

11. The method according to claim 8 wherein the detected gesture includes a grip gesture.

12. The method according to claim 8 wherein the first and second digital cameras are positioned laterally outward of the plurality of keys.

13. The method according to claim 8 wherein the first and second digital cameras and the plurality of keys are supported by a housing.

14. The method according to claim 13 wherein the housing defines first and second apertures for the first and second digital cameras.

15. A keyboard apparatus for a computer, the keyboard apparatus comprising:  
a housing defining an upper surface;

a plurality of keys extending through the housing upper surface; and

first and second digital cameras supported at the housing upper surface and having overlapping fields of view in the region above the plurality of keys, the digital cameras providing respective first and second outputs, wherein the first and second outputs are adapted to be coupled to a processing unit operable to determine a gesture performed in the overlapping fields of view.

16. The keyboard apparatus of claim 15 wherein the housing defines first and second apertures for the first and second digital cameras.

17. The keyboard apparatus of claim 16 wherein the housing includes first and second transparent covers overlying the first and second apertures.

18. The keyboard apparatus of claim 15 wherein the detected gesture includes a pinch gesture.

19. The keyboard apparatus of claim 15 wherein the detected gesture includes a pointing gesture.

20. The keyboard apparatus of claim 15 wherein the detected gesture includes a grip gesture.



## ABSTRACT

A method for enhancing a well-being of a small child or baby utilizes at least one TV camera positioned to observe one or more points on the child or an object associated with the child. Signals from the TV camera are outputted to a computer, which analyzes the output signals to determine a position or movement of the child or child associated object. The determined position or movement is then compared to preprogrammed criteria in the computer to determine a correlation or importance, and thereby to provide data to the child.

8727433

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	
<b>Filing Date:</b>	
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Attorney Docket Number:</b>	135873.152187-US

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
Utility filing Fee (Electronic filing)	4011	1	98	98
Utility Search Fee	2111	1	310	310
Utility Examination Fee	2311	1	125	125

**Pages:**

**Claims:**

**Miscellaneous-Filing:**

**Petition:**

**Patent-Appeals-and-Interference:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>533</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	14468972
<b>Application Number:</b>	13714748
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<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Filer Authorized By:</b>	Vito Anthony Ciaravino
<b>Attorney Docket Number:</b>	135873.152187-US
<b>Receipt Date:</b>	14-DEC-2012
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1	Application Data Sheet	ADS.pdf	1433192 0e293d186849a270d74b8af25f027ddd72180785	no	6
<b>Warnings:</b>					
<b>Information:</b>					
2	Oath or Declaration filed	Dec.pdf	1400658 b78dfa467b8071996de83590eed6e8def92ad568	no	1
<b>Warnings:</b>					
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3	Drawings-only black and white line drawings	Drawings.pdf	382154 90e5d917f3ede9d8f024f3c324c7b337ebad0122	no	7
<b>Warnings:</b>					
<b>Information:</b>					
4		Spec_152187.pdf	126270 bb36bcc7d59247a2035f4e365d9be6fac725e991	yes	29
	<b>Multipart Description/PDF files in .zip description</b>				
	<b>Document Description</b>		<b>Start</b>	<b>End</b>	
	Specification		1	25	
	Claims		26	28	
	Abstract		29	29	
<b>Warnings:</b>					
<b>Information:</b>					
5	Fee Worksheet (SB06)	fee-info.pdf	32801 b2ef51a89af5dba3d7cf297cdf32e6b43d75c21f	no	2
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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	135873.152187-US
		Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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**Inventor Information:**

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Timothy	R.	Pryor			
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Title of the Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS		
Attorney Docket Number	135873.152187-US	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	7	Suggested Figure for Publication (if any)	1

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

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Customer Number	24335		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation of	12700055	2010-02-04		
Prior Application Status	Abandoned		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
12700055	Continuation of	10866191	2004-06-14		
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10866191	Continuation of	09433297	1999-11-03	6750848	2011-11-25
Prior Application Status	Expired		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
09433297	non provisional of	60107652	1998-11-09		
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IPR2022-00090 - LGE



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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Application Number	Country <sup>i</sup>	Filing Date (YYYY-MM-DD)	Priority Claimed
			<input type="radio"/> Yes <input checked="" type="radio"/> No

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In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

<b>Applicant 1</b>	<input type="button" value="Remove"/>
<p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>	
<input type="button" value="Clear"/>	
<input type="radio"/> Assignee	<input type="radio"/> Legal Representative under 35 U.S.C. 117
<input type="radio"/> Person to whom the inventor is obligated to assign.	<input type="radio"/> Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:	
Name of the Deceased or Legally Incapacitated Inventor : <input type="text"/>	
If the Applicant is an Organization check here. <input type="checkbox"/>	

Prefix	Given Name	Middle Name	Family Name	Suffix

<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province		
Country <sup>i</sup>		Postal Code		
Phone Number		Fax Number		
Email Address				

Additional Applicant Data may be generated within this form by selecting the Add button.	<input type="button" value="Add"/>
------------------------------------------------------------------------------------------	------------------------------------

## Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

<b>Assignee 1</b>
<p>Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).</p>
<input type="button" value="Remove"/>

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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province		
Country i	Postal Code			
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications				
<b>Signature</b>	/Vito A. Ciaravino		Date (YYYY-MM-DD)	2012-12-14
First Name	Vito	Last Name	Ciaravino	Registration Number
Additional Signature may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

# Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY.DOCKET.NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/714,748, 12/14/2012, 2691, 533, 135873.152187-US, 20, 3

CONFIRMATION NO. 3254

FILING RECEIPT



24335
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Date Mailed: 01/22/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections

Inventor(s)

Timothy R. Pryor, Sylvania, OH;

Applicant(s)

Timothy R. Pryor, Sylvania, OH;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 12/700,055 02/04/2010
which is a CON of 10/866,191 06/14/2004 ABN
which is a CON of 09/433,297 11/03/1999 PAT 6750848
which claims benefit of 60/107,652 11/09/1998

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 01/14/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/714,748

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

\*\* SMALL ENTITY \*\*

**Title**

MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

**Preliminary Class**

345

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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**Title 35, United States Code, Section 184**

**Title 37, Code of Federal Regulations, 5.11 & 5.15**

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#### **NOT GRANTED**

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Table with 4 columns: APPLICATION NUMBER (13/714,748), FILING OR 371(C) DATE (12/14/2012), FIRST NAMED APPLICANT (Timothy R. Pryor), ATTY. DOCKET NO./TITLE (135873.152187-US)

CONFIRMATION NO. 3254

FORMALITIES LETTER



24335
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Date Mailed: 01/22/2013

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
- The application contains drawings, but the specification does not contain a brief description of the several views of the drawings as required by 37 CFR 1.74 and 37 CFR 1.77(b)(7).
- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
- More than one figure is present and each figure is not labeled "Fig." with a consecutive Arabic numeral (1, 2, etc.) or an Arabic numeral and capital letter in the English alphabet (A, B, etc.)(see 37 CFR 1.84(u)(1)). See Figure(s) 7. A brief description of the several views of the drawings (see 37 CFR 1.74) should be added or amended to correspond to the corrected numbering of the figures. See also 37 CFR 1.77(b)(7).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.



Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

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/jmilani/

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number  
13/714,748

**APPLICATION AS FILED - PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	20 minus 20 = *	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 = *	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	98
N/A	310
N/A	125
x 31 =	0.00
x 125 =	0.00
	0.00
	0.00
<b>TOTAL</b>	<b>533</b>

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
<b>TOTAL</b>	

**APPLICATION AS AMENDED - PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

App. No. : 13/714,748  
Filing Date : December 14, 2012  
Inventor : Timothy R. Pryor  
For : MORE USEFUL MAN MACHINE INTERFACES AND  
APPLICATIONS  
Attorney Docket No. : 135873.152187-US

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS**  
**AND**  
**SUBSTITUTE SPECIFICATION UNDER 37 C.F.R. § 1.125**

Responsive to the Notice to File Corrected Application Papers mailed January 22, 2013, the period for response being until March 22, 2013, enclosed is a Substitute Specification with markings showing all changes and a Substitute Specification clean version (without markings). The Substitute Specification is amended to clarify a reference to Figs. 7A-7B. No new matter has been added.

In view of the enclosure, it is respectfully submitted that an action on the merits is in order; and such is respectfully requested.

Respectfully submitted,

TIMOTHY R. PRYOR

By: Warner Norcross & Judd LLP

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Rebecca A. Becker  
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900 Fifth Third Center  
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(616) 752-2260

9031486

**SUBSTITUTE SPECIFICATION**  
(Marked-Up Copy)

MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Patent Application No. 12/700,055, filed February 4, 2010 (now U.S. Patent \_\_\_\_\_), which is a continuation of U.S. Patent Application No. 10/866,191, filed June 14, 2004, which is a continuation of U.S. Patent Application No. 09/433,297, filed November 3, 1999 (now U.S. Patent 6,750,848), which claims benefit of U.S. Provisional Application No. 60/107,652, filed November 9, 1998. These applications are hereby incorporated by reference.

REFERENCES TO RELATED APPLICATIONS BY THE INVENTORS

- [0002] U.S. Patent Application No. 09/138,339, filed August 21, 1998.
- [0003] U.S. Provisional Application No. 60/056,639, filed August 22, 1997.
- [0004] U.S. Provisional Application No. 60/059,561, filed September 19, 1998.
- [0005] Man Machine Interfaces: SN 08/290,516, filed 8/15/1994, and now USP 6,008,800.
- [0006] Touch TV and Other Man Machine Interfaces: SN 08/496,908, filed 6/29/1995, and now USP 5,982,352.
- [0007] Systems for Occupant Position Sensing: SN 08/968,114, filed 11/12/1997, now abandoned, which claims benefit of 60/031,256, filed 11/12/1996.
- [0008] Target holes and corners: USSN 08/203,603, filed 2/28/1994, and 08/468,358 filed 6/6/1995, now USP 5,956,417 and USP 6,044, 183.

[0009] Vision Target Based Assembly: USSN 08/469,429, filed 6/6/1995, now abandoned; 08/469,907, filed 6/6/1995, now USP 6,301,763; 08/470,325, filed 6/6/1995, now abandoned; and 08/466,294, filed 6/6/1995, now abandoned.

[00010] Picture Taking Method and Apparatus: Provisional Application no. 60/133,671, filed May 11, 1998.

[00011] Methods and Apparatus for Man Machine Interfaces and Related Activity: Provisional Application no. 60/133,673 filed May 11, 1998.

[00012] Camera Based Man-Machine Interfaces: Provisional Patent Application no. 60/142,777, filed July 8, 1999.

[00013] The copies of the disclosure of the above referenced applications are incorporated herein by reference.

### BACKGROUND OF THE INVENTION

[00014] Field of the Invention

[00015] The invention relates to simple input devices for computers, particularly, but not necessarily, intended for use with 3-D graphically intensive activities, and operating by optically sensing object or human positions and/or orientations. The invention in many preferred embodiments, uses real time stereo photogrammetry using single or multiple TV cameras whose output is analyzed and used as input to a personal computer, typically to gather data concerning the 3D location of parts of, or objects held by, a person or persons.

[00016] This continuation application seeks to provide further detail on useful embodiments for computing. One embodiment is a keyboard for a laptop computer (or stand alone keyboard for any computer) that incorporates digital TV cameras to look at points on,

typically, the hand or the finger, or objects held in the hand of the user, which are used to input data to the computer. It may also or alternatively, look at the head of the user as well.

[00017] Both hands or multiple fingers of each hand, or an object in one hand and fingers of the other can be simultaneously observed, as can alternate arrangements as desired.

#### DESCRIPTION OF RELATED ART

[00018] My referenced co-pending applications incorporated herein by reference discuss many prior art references in various pertinent fields, which form a background for this invention.

#### BRIEF DESCRIPTION OF FIGURES

[00019] Fig. 1 illustrates a laptop or other computer keyboard with cameras according to the invention located on the keyboard surface to observe objects such as fingers and hands overhead of the keyboard.

[00020] Fig. 2 illustrates another keyboard embodiment using special datums or light sources such as LEDs.

[00021] Fig. 3 illustrates a further finger detection system for laptop or other computer input.

[00022] Fig. 4 illustrates learning, amusement, monitoring, and diagnostic methods and devices for the crib, playpen and the like.

[00023] Fig. 5 illustrates a puzzle toy for young children having cut out wood characters according to the invention.

[00024] Fig. 6 illustrates an improved handheld computer embodiment of the invention, in which the camera or cameras may be used to look at objects, screens and the like as well as look at the user along the lines of Fig. 1.

[00025] Figs. 7A-B illustrate[[s]] new methods for internet commerce and other activities involving remote operation with 3D virtual objects display.

### DESCRIPTION OF THE INVENTION

#### Figure 1

[00026] A laptop (or other) computer keyboard based embodiment is shown in Fig. 1. In this case, a stereo pair of cameras 100 and 101 located on each side of the keyboard are used, desirably having cover windows 103 and 104 mounted flush with the keyboard surface 102. The cameras are preferably pointed obliquely inward at angles  $\Phi$  toward the center of the desired work volume 170 above the keyboard. In the case of cameras mounted at the rear of the keyboard (toward the display screen), these cameras are also inclined to point toward the user at an angle as well.

[00027] Alternate camera locations may be used such as the positions of cameras 105 and 106, on upper corners of screen housing 107 looking down at the top of the fingers (or hands, or objects in hand or in front of the cameras), or of cameras 108 and 109 shown.

[00028] One of the referenced embodiments of the invention is to determine the pointing direction vector 160 of the user's finger (for example pointing at an object displayed on screen 107), or the position and orientation of an object held by the user. Alternatively, finger position data can be used to determine gestures such as pinch or grip, and other examples of relative juxtaposition of objects with respect to each other, as has been described in co-pending referenced applications. Positioning of an object or portions (such as hands or fingers of a doll) is also of use, though more for use with larger keyboards and displays.



[00029] In one embodiment, shown in Fig. 2, cameras such as 100/101 are used to simply look at the tip of a finger 201 (or thumb) of the user, or an object such as a ring 208 on the finger. Light from below, such as provided by single central light 122 can be used to illuminate the finger that typically looks bright under such illumination.

[00030] It is also noted that the illumination is directed or concentrated in an area where the finger is typically located such as in work volume 170. If the light is of sufficient spectral content, the natural flesh tone of the finger can be observed – and recognized by use of the color TV cameras 100/101.

[00031] As is typically the case, the region of the overlapping cameras viewing area is relatively isolated to the overlapping volumetric zone of their fields 170 shown due to focal lengths of their lenses and the angulation of the camera axes with respect to each other. This restricted overlap zone helps mitigate against unwanted matches in the two images due to information generated outside the zone of overlap. Thus there are no significant image matches found of other objects in the room, since the only flesh-toned object in the zone is typically the finger or fingers of the user. Or alternatively, for example, the user's hand or hands. Similarly objects or targets thereon can be distinguished by special colors or shapes.

[00032] If desired, or required, motion of the fingers can be also used to further distinguish their presence vis-a-vis any static background. If for example, by subtraction of successive camera frames, the image of a particular object is determined to have moved it is determined that this is likely the object of potential interest which can be further analyzed directly to determine if is the object of interest.

[00033] In case of obscuration of the fingers or objects in the hand, cameras in additional locations such as those mentioned above, can be used to solve for position if the view of one or more cameras is obscured.

[00034] The use of cameras mounted on both the screen and the keyboard allows one to deal with obscurations that may occur and certain objects may or may not be advantageously delineated in one view or the other.

[00035] In addition, it may be in many cases desirable to have a datum on the top of the finger as opposed to the bottom because on the bottom, it can get in the way of certain activities. In this case the sensors are required on the screen looking downward or in some other location such as off the computer entirely and located overhead has been noted in previous application.

[00036] To determine finger location, a front end processor like that described in the target holes and corners co-pending application reference incorporated USSN 08/203,603 and 08/468,358 can be used to also allow the finger shape as well as color to be detected.

[00037] Finger gestures comprising a sequence of finger movements can also be detected by analyzing sequential image sets such as the motion of the finger, or one finger with respect to another such as in pinching something can be determined. Cameras 100 and 101 have been shown at the rear of the keyboard near the screen or at the front. They may mount in the middle of the keyboard or any other advantageous location.

[00038] The cameras can also see one's fingers directly, to allow typing as now, but without the physical keys. One can type in space above the plane of the keyboard (or in this case plane of the cameras). This is useful for those applications where the keyboard of conventional style is too big (e.g., the hand held computer of Fig. 6).

[00039] Figure 2

[00040] It is also desirable for fast reliable operation to use retro-reflective materials and other materials to augment the contrast of objects used in the application. For example, a line target such as 200 can be worn on a finger 201, and advantageously can be located if desired between two joints of the finger as shown. This allows the tip of the finger to be used to type on the keyboard without feeling unusual – the case perhaps with target material on tip of the finger.

[00041] The line image detected by the camera can be provided also by a cylinder such as retroreflective cylinder 208 worn on the finger 201 which effectively becomes a line image in the field of view of each camera (assuming each camera is equipped with a sufficiently coaxial light source, typically one or more LEDs such as 210 and 211), can be used to solve easily using the line image pairs with the stereo cameras for the pointing direction of the finger that is often a desired result. The line, in the stereo pair of images provides the pointing direction of the finger, for example pointing at an object displayed on the screen 140 of the laptop computer 138.

[00042] Figure 3

[00043] It is also possible to have light sources on the finger that can be utilized such as the 2 LED light sources shown in Fig. 3. This can be used with either TV camera type sensors or with PSD type analog image position sensors as disclosed in references incorporated.

[00044] In particular the ring mounted LED light sources 301 and 302 can be modulated at different frequencies that can be individually discerned by sensors imaging the sources on to a respective PSD detector. Alternatively, the sources can simply be turned on and off at different times such that the position of each point can be independently found allowing the pointing

direction to be calculated from the LED point data gathered by the stereo pair of PSD based sensors.

[00045] The “natural interface keyboard” here described can have cameras or other sensors located at the rear looking obliquely outward toward the front as well as inward so as to have their working volume overlap in the middle of the keyboard such as the nearly full volume over the keyboard area is accommodated.

[00046] Clearly larger keyboards can have a larger working volume than one might have on a laptop. The pair of sensors used can be augmented with other sensors mounted on the screen housing. It is noted that the linked dimension afforded for calibration between the sensors located on the screen and those on the keyboard is provided by the laptop unitary construction.

[00047] One can use angle sensing means such as a rotary encoder for the laptop screen tilt. Alternatively, cameras located on the screen can be used to image reference points on the keyboard as reference points to achieve this. This allows the calibration of the sensors mounted fixedly with respect to the screen with respect to the sensors and keyboard space below. It also allows one to use stereo pairs of sensors that are not in the horizontal direction (such as 101/102) but could for example be a camera sensor such as 100 on the keyboard coupled with one on the screen, such as 106.

[00048] Knowing the pointing angles of the two cameras with respect to one another allows one to solve for the 3D location of objects from the matching of the object image positions in the respective camera fields.

[00049] As noted previously, it is also of interest to locate a line or cylinder type target on the finger between the first and second joints. This allows one to use the fingertip for the

keyboard activity but by raising the finger up, it can be used as a line target capable of solving for the pointed direction for example.

[00050] Alternatively one can use two point targets on the finger such as either retroreflective datums, colored datums such as rings or LED light sources that can also be used with PSD detectors which has also been noted in Fig. 2.

[00051] When using the cameras located for the purpose of stereo determination of the position of the fingers from their flesh tone images it is useful to follow the preprocessing capable of processing data obtained from the cameras in order to look for the finger. This can be done on both color basis and on the basis of shape as well as motion.

[00052] In this invention, I have shown the use of not only cameras located on a screen looking downward or outward from the screen, but also cameras that can be used instead of or in combination with those on the screen placed essentially on the member on which the keyboard is incorporated. This allows essentially the keyboard to mounted cameras which are preferably mounted flush with the keyboard surface to be unobtrusive, and yet visually be able to see the users fingers, hands or objects held by the user and in some cases, the face of the user.

[00053] This arrangement is also useful for 3D displays, for example where special synchronized glasses (e.g., the “Crystal Eyes” brand often used with Silicon Graphics work stations) are used to alternatively present right and left images to each eye. In this case the object may appear to be actually in the workspace 170 above the keyboard, and it may be manipulated by virtually grasping (pushing, pulling, etc.) it, as has been described in co-pending applications.

[00054] Figure 4: Baby Learning and Monitoring System

[00055] A baby's reaction to the mother (or father) and the mother's analysis of the baby's reaction is very important. There are many gestures of babies apparently indicated in child psychology as being quite indicative of various needs, wants, or feelings and emotions, etc. These gestures are typically made with the baby's hands.

[00056] Today this is done and learned entirely by the mother being with the baby. However with an Electro-optical sensor based computer system, such as that described in co-pending applications located proximate to or even in the crib (for example), one can have the child's reactions recorded, not just in the sense of a video tape which would be too long and involved for most to use, but also in terms of the actual motions which could be computer recorded and analyzed also with the help of the mother as to what the baby's responses were. And such motions, combined with other audio and visual data can be very important to the baby's health, safety, and learning.

[00057] Consider for example crib 400 with computer 408 having LCD monitor 410 and speaker 411 and camera system (single or stereo) 420 as shown, able to amuse or inform baby 430, while at the same time recording (both visually, aurally, and in movement detected position data concerning parts of his body or objects such as rattles in his hand) his responses for any or all of the purposes of diagnosis of his state of being, remote transmission of his state, cues to various programs or images to display to him or broadcast to others, or the like.

[00058] For one example, baby's motions could be used to signal a response from the TV either in the absence of the mother or with the mother watching on a remote channel. This can even be over the Internet if the mother is at work.

[00059] For example, a comforting message could come up on the TV from the mother that could be prerecorded (or alternatively could actually be live with TV cameras in the mother's or father's workplace for example on a computer used by the parent) to tell the baby something reassuring or comfort the baby or whatever. Indeed the parent can be monitored using the invention and indicate something back or even control a teleoperator robotic device to give a small child something to eat or drink for example. The same applies to a disabled person.

[00060] If the father or mother came up on the screen, the baby could wave at it, move its head or "talk" to it but the hand gestures may be the most important.

[00061] If the mother knows what the baby is after, she can talk to baby or say something, or show something that the baby recognizes such as a doll. After a while, looking at this live one can then move to talking to the baby from some prerecorded data.

[00062] What other things might we suppose? The baby for example knows to puts its hand on the mother's cheek to cause the mother to turn to it. The baby also learns some other reflexes when it is very young that it forgets when it gets older. Many of these reflexes are hand movements, and are important in communicating with the remote TV based mother representation, whether real via telepresence or from CD Rom or DVD disk (or other media, including information transmitted to the computer from afar) and for the learning of the baby's actions.

[00063] Certainly just from the making the baby feel good point-of-view, it would seem like certain motherly (or fatherly, etc.) responses to certain baby actions in the form of words and images would be useful. This stops short of physical holding of the baby which is often needed, but could act as a stop gap to allow the parents to get another hour's sleep for example.

[00064] As far as the baby touching things, I've discussed in other applications methods for realistic touch combined with images. This leads to a new form of touching crib mobiles that could contain video imaged and or be imaged themselves – plus if desired – touched in ways that would be far beyond any response that you could get from a normal mobile.

[00065] For example, let us say there is a targeted (or otherwise TV observable) mobile 450 in the crib above the baby. Baby reaches up and touches a piece of the mobile which is sensed by the TV camera system (either from the baby's hand position, the mobile movement, or both, and a certain sound is called up by the computer, a musical note for example. Another piece of the mobile and another musical note. The mobile becomes a musical instrument for the baby that could play either notes or chords or complete passages, or any other desired programmed function.

[00066] The baby can also signal things. The baby can signal using agitated movements would often mean that it's unhappy. This could be interpreted using learned movement signatures and artificial intelligence as needed by the computer to call for mother even if the baby wasn't crying. If the baby cries, that can be picked up by microphone 440, recognized using a voice recognition system along the lines of that used in IBM Via Voice commercial product for example. And even the degree of crying can be analyzed to determine appropriate action.

[00067] The computer could also be used to transmit information of this sort via the internet email to the mother who could even be at work. And until help arrives in the form of mother intervention or whatever, the computer could access a program that could display on a screen for the baby things that the baby likes and could try to soothe the baby through either



images of familiar things, music or whatever. This could be useful at night when parents need sleep, and anything that would make the baby feel more comfortable would help the parents.

[00068] It could also be used to allow the baby to input to the device. For example, if the baby was hungry, a picture of the bottle could be brought up on the screen. The baby then could yell for the bottle. Or if the baby needed his diaper changed, perhaps something reminiscent of that. If the baby reacts to such suggestions of his problem, this gives a lot more intelligence as to why he is crying and while mothers can generally tell right away, not everyone else can. In other words, this is pretty neat for babysitters and other members of the household so they can act more intelligently on the signals the baby is providing.

[00069] Besides in the crib, the system as described can be used in conjunction with a playpen, hi-chair or other place of baby activity.

[00070] As the child gets older, the invention can further be used also with more advanced activity with toys, and to take data from toy positions as well. For example, blocks, dolls, little cars, and moving toys even such as trikes, scooters, drivable toy cars and bikes with training wheels.

[00071] The following figure illustrates the ability of the invention to learn, and thus to assist in the creation of toys and other things.

[00072] Figure 5: Learning Puzzle Roy

[00073] Disclosed in Fig. 5 is a puzzle toy 500 where woodcut animals such as bear 505 and lion 510 are pulled out with handle such as 511. The child can show the animal to the camera and a computer 530 with TV camera (or cameras) 535 can recognize the shape as the animal, and provide a suitable image and sounds on screen 540.

[00074] Alternatively, and more simply, a target, or targets on the back of the animal can be used such as triangle 550 on the back of lion 511. In either case the camera can solve for the 3D, and even 5 or 6D position and orientation of the animal object, and cause it to move accordingly on the screen as the child maneuvers it. The child can hold two animals, one in each hand and they can each be detected, even with a single camera, and be programmed in software to interact as the child wishes (or as he learns the program).

[00075] This is clearly for very young children of two or three years of age. The toys have to be large so they can't be swallowed.

[00076] With the invention in this manner, one can make a toy of virtually anything, for example a block. Just hold this block up, teach the computer/camera system the object and play using any program you might want to represent it and its actions. To make this block known to the system, the shape of the block, the color of the block or some code on the block can be determined. Any of those items could tell the camera which block it was, and most could give position and orientation if known.

[00077] At that point, an image is called up from the computer representing that particular animal or whatever else the block is supposed to represent. Of course this can be changed in the computer to be a variety of things if this is something that is acceptable to the child. It could certainly be changed in size such as a small lion could grow into a large lion. The child could probably absorb that more than a lion changing into a giraffe for example since the block wouldn't correspond to that. The child can program or teach the system any of his blocks to be the animal he wants and that might be fun.

[00078] For example, he or the child's parent could program a square to be a giraffe where as a triangle would be a lion. Maybe this could be an interesting way to get the child to learn his geometric shapes!

[00079] Now the basic block held up in front of the camera system could be looked at just for what it is. As the child may move the thing toward or away from the camera system, one may get a rough sense of depth from the change in shape of the object. However this is not so easy as the object changes in shape due to any sort of rotations.

[00080] Particularly interesting then is to also sense the rotations if the object so that the animal can actually move realistically in 3 Dimensions on the screen. And perhaps having the de-tuning of the shape of the movement so that the child's relatively jerky movements would not appear jerky on the screen or would not look so accentuated. Conversely of course, you can go the other way and accentuate the motions.

[00081] This can, for example, be done with a line target around the edge of the object is often useful for providing position or orientation information to the TV camera based analysis software, and in making the object easier to see in reflective illumination.

[00082] Aid to speech recognition

[00083] The previous co-pending application entitled "Useful man machine interfaces and applications" referenced above, discussed the use of persons movements or positions to aid in recognizing the voice spoken by the person.

[00084] In one instance, this can be achieved by simply using ones hand to indicate to the camera system of the computer that the voice recognition should start (or stop, or any other function, such as a paragraph or sentence end, etc.).

[00085] Another example is to use the camera system of the invention to determine the location of the persons head (or other part), from which one can instruct a computer to preferentially evaluate the sound field in phase and amplitude of two or more spaced microphones to listen from that location – thus aiding the pickup of speech – which often times is not able to be heard well enough for computer based automatic speech recognition to occur.

[00086] Digital interactive TV

[00087] As you watch TV, data can be taken from the camera system of the invention and transmitted back to the source of programming. This could include voting on a given proposition by raising your hand for example, with your hand indication transmitted. Or you could hold up 3 fingers, and the count of fingers transmitted. Or in a more extreme case, your position, or the position of an object or portion thereof could be transmitted – for example you could buy a coded object – whose code would be transmitted to indicate that you personally (having been pre-registered) had transmitted a certain packet of data.

[00088] If the programming source can transmit individually to you (not possible today, but forecast for the future), then much more is possible. The actual image and voice can respond using the invention to positions and orientations of persons or objects in the room – just as in the case of prerecorded data – or one to one internet connections. This allows group activity as well.

[00089] In the extreme case, full video is transmitted in both directions and total interaction of users and programming sources and each other becomes possible.

[00090] An interim possibility using the invention is to have a program broadcast to many, which shifts to prerecorded DVD disc or the like driving a local image, say when your hand input causes a signal to be activated.

[00091]        Handwriting authentication

[00092]        A referenced co-pending application illustrated the use of the invention to track the position of a pencil in three dimensional space such that the point at which the user intends the writing point to be at, can be identified and therefore used to input information, such as the intended script.

[00093]        As herein disclosed, this part of the invention can also be used for the purpose of determining whether or not a given person's handwriting or signature is correct.

[00094]        For example, consider authentication of an Internet commercial transaction. In this case, the user simply writes his name or address and the invention is used to look at the movements of his writing instrument and determine from that whether or not the signature is authentic. (A movement of one or more of his body parts might also or alternatively be employed). For example a series of frames of datum location on his pen can be taken, to determine one or more positions on it as a function of time, even to include calculating of its pointing direction, from a determined knowledge in three axes of two points along the line of the pen axis. In this case a particular pointing vector sequence "signature" would be learned for this person, and compared to later signatures.

[00095]        What is anticipated here is that in order to add what you might call the confirming degree of authenticity to the signature, it may not be necessary to track the signature completely. Rather one might only determine that certain aspects of the movement of the pencil are the authentic ones. One could have people write using any kind of movement, not just their signature having their name. The fact is that people are mostly used to writing their name and it would be assumed that that would be it. However, it could well be that the computer asks the user to write

something else that they would then write and that particular thing would be stored in the memory.

[00096]        Optionally, one's voice could be recognized in conjunction with the motion signature to add further confirmation.

[00097]        This type of ability for the computer system at the other end of the Internet to query a writer to write a specific thing in a random fashion adds a degree of cryptographic capacity to the invention. In other words, if I can store the movements in my hand to write different things, then clearly this has some value.

[00098]        The important thing though is that some sort of representation of the movements of the pencil or other instrument can be detected using the invention and transmitted.

[00099]        Figure 6: Hand Held Computer

[000100]       Fig. 6 illustrates an improved handheld computer embodiment of the invention. For example, Fig. 8 of the provisional application referenced above entitled "camera based man machine interfaces and applications" illustrates a basic hand held device and which is a phone, or a computer or a combination thereof, or alternatively to being hand held, can be a wearable computer for example on one's wrist.

[000101]       In this embodiment, we further disclose the use of this device as a computer, with a major improvement being the incorporation of a camera of the device optionally in a position to look at the user, or an object held by the user- along the lines of Fig. 1 of the instant disclosure for example.

[000102]       Consider hand held computer 901 of Fig. 6, incorporating a camera 902 which can optionally be rotated about axis 905 so as to look at the user or a portion thereof such as

finger 906, or at objects at which it is pointed. Optionally, and often desirably, a stereo pair of cameras to further include camera 910 can also be used. It too may rotate, as desired. Alternatively fixed cameras can be used as in Fig. 1, and Fig. 8 of the referenced co-pending application, when physical rotation is not desired, for ruggedness, ease of use, or other reasons (noting that fixed cameras have fixed fields of view, which limit versatility in some cases).

[000103] When aimed at the user, as shown, it can be used, for example, to view and obtain images of:

[000104] Ones self-facial expression etc., also for image reasons, id etc., combined effect.

[000105] Ones fingers (any or all), one finger to other and the like. This in turn allows conversing with the computer in a form of sign language which can replace the keyboard of a conventional computer.

[000106] One or more objects in one's hand. Includes a pencil or pen, and thus can be used rather than having a special touch screen and pencil if the pencil itself is tracked as disclosed in the above figure. It also allows small children to use the device, and those who cannot hold an ordinary stylus.

[000107] One's gestures.

[000108] The camera 902 (and 910 if used, and if desired), can also be optionally rotated and used to viewpoints in space ahead of the device, as shown in dotted lines 902a. In this position for example it can be used for the purposes described in the previous application. It can also be used to observe or point at (using optional laser pointer 930) points such as 935 on a wall, or a mounted LCD or projection display such as 940 on a wall or elsewhere such as on the back of an airline seat.

[000109] With this feature of the invention, there is no requirement to carry a computer display with you as with a infrared connection (not shown) such as known in the art one can also transmit all normal control information to the display control computer 951. As displays become ubiquitous, this makes increasing sense - otherwise the displays get bigger the computers smaller trend doesn't make sense if they need to be dragged around together. As one walks into a room, one uses the display or displays in that room (which might themselves be interconnected).

[000110] The camera unit 902 can sense the location of the display in space relative to the handheld computer, using for example the four points 955-958 on the corners of the display as references. This allows the handheld device to become an accurate pointer for objects displayed on the screen, including control icons. And it allows the objects on the screen to be sensed directly by the camera- if one does not have the capability to spatially synchronize and coordinate the display driver with the handheld computer.

[000111] The camera can also be used to see gestures of others, as well as the user, and to acquire raw video images of objects in its field.

[000112] A reverse situation also exists where the cameras can be on the wall mounted display, such as cameras 980 and 981 can be used to look at the handheld computer module 901 and determine its position and orientation relative to the display.

[000113] Note that a camera such as 902, looking at you the user, if attached to hand held unit, always has reference frame of that unit. If one works with a screen on a wall, one can aim the handheld unit with camera at it, and determine its reference frame to the handheld unit. Also can have two cameras operating together, one looking at wall thing, other at you (as 902 and 902a) in this manner, one can dynamically compare ref frames of the display to the human input



means in determining display parameters. This can be done in real time, and if so one can actually wave the handheld unit around while still inputting accurate data to the display using ones fingers, objects or whatever.

[000114] Use of a laser pointer such as 930 incorporated into the handheld unit has also been disclosed in the referenced co-pending applications. For example, a camera on the handheld computer unit such as 902 viewing in direction 902a would look at laser spot such as 990 (which might or might not have come from the computers own laser pointer 930) on the wall display say, and recognized by color and size/shape reference to edge of screen, and to projected spots on screen.

[000115] Figures 7A-B: Internet and Other Remote Applications

[000116] Fig. 7A illustrates new methods for internet commerce and other activities involving remote operation with 3D virtual objects displayed on a screen. This application also illustrates the ability of the invention to prevent computer vision eye strain.

[000117] Let us first consider the operation of the invention over the internet as it exists today in highly bandwidth limited form dependent on ordinary phone lines for the most part. In this case it is highly desirable to transmit just the locations or pointing vectors of portions (typically determined by stereo photo-grammetry of the invention) of human users or objects associated therewith to a remote location, to allow the remote computer 10 to modify the image or sound transmitted back to the user.

[000118] Another issue is the internet time delay, which can exist in varying degrees, and is more noticeable, the higher resolution of the imagery transmitted. In this case, a preferred arrangement is to have real time transmission of minimal position and vector data (using no more

bandwidth than voice), and to transmit back to the user, quasi stationary images at good resolution. Transmission of low resolution near real time images common in internet telephony today, does not convey the natural feeling desired for many commercial applications to now be discussed. As bandwidth becomes more plentiful these restrictions are eased.

[000119] Let us consider the problem posed of getting information from the internet of today. A user 1000 can go to a virtual library displayed on screen 1001 controlled by computer 1002 where one sees a group 1010 of books on stacks. Using the invention as described herein and incorporated referenced applications to determine my hand and finger locations, I the user, can point at a book such as 1014 in a computer sensed manner, or even reach out and “grab” a book, such as 1020 (dotted lines) apparently generated in 3D in front of me.

[000120] My pointing, or my reach and grab is in real time, and the vector (such as the pointing direction of ones finger at the book on the screen, or the position and orientation closing vectors of one’s forefinger and thumb to grab the 3D image 1020 of the book) indicating the book in question created is transmitted back by internet means to the remote computer 1030 which determines that I have grabbed the book entitled War and Peace from the virtual shelf. A picture of the book coming off the shelf is then generated using fast 3D graphical imagery such as the Merlin VR package available today from Digital Immersion company of Sudbury, Ontario. This picture (and the original picture of the books on the shelves) can be retransmitted over the internet at low resolution (but sufficient speed) to give a feeling of immediacy to the user. Or alternatively, the imagery can be generated locally at higher resolution using the software package resident in the local computer 1002 which receives key commands from the distant computer 1030.

[000121] After the book has been “received” by the user, it then can be opened automatically to the cover page for example under control of the computer, or the users 10 hands can pretend to open it, and the sensed hands instruct the remote (or local, depending on version) computer to do so. A surrogate book such as 1040 can also be used to give the user a tactile feel of a book, even though the real book in questions pages will be viewed on the display screen 1001. One difference to this could be if the screen 1001 depicting the books were life size, like real stacks. Then one might wish to go over to a surrogate book incorporating a separate display screen- just as one would in a real library, go to a reading table after removing a book from a stack.

[000122] Net Grocery stores have already appeared, and similar applications concern picking groceries off of the shelf of a virtual supermarket, and filling ones shopping cart. For that matter, any store where it is desired to show the merchandise in the very manner people are accustomed to seeing it, namely on shelves or racks, generally as one walks down an aisle, or fumbles through a rack of clothes for example. In each case, the invention, which also can optionally use voice input, as if to talk to a clothing sales person, can be used to monitor the person’s positions and gestures.

[000123] The invention in this mode can also be used to allow one to peruse much larger objects. For example, to buy a car (or walk through a house, say) over the internet, one can lift the hood, look inside, etc., all by using the invention to monitor the 3D position of your head or hands and move the image of the car presented accordingly. If the image is presented substantially life-size, then one can be monitored as one physically walks around the car in one’s room say, with the image changing accordingly. In other words just as today.

[000124] Note that while the image can be apparently life-size using virtual reality glasses, the natural movements one is accustomed to in buying a car are not present. This invention makes such a natural situation possible (though it can also be used with such glasses as well).

[000125] It is noted that the invention also comprehends adding a force based function to a feedback to your hands, such that it feels like you lifted the hood, or grabbed the book, say. For this purpose holding a surrogate object as described in co-pending applications could be useful, in this case providing force feedback to the object.

[000126] If one looks at internet commerce today, some big applications have turned out 10 to be clothes and books. Clothes are by far the largest expenditure item, and let's look closer at this.

[000127] Consider too a virtual mannequin, which can also have measurements of a remote shopper. For example, consider diagram 78, where a woman's measurements are inputted by known means such as a keyboard 1050 over the internet to a CAD program in computer 1055, which creates on display screen 1056 a 3D representation of a mannequin 1059 having the woman's shape in the home computer 1060 . As she selects a dress 1065 to try on, the dress which let's say comes in 10 sizes, 5 to 15, is virtually "tried on" the virtual mannequin and the woman 1070 looks at the screen 1056 and determines the fit of a standard size 12 dress. She can rapidly select larger or smaller sizes and decide which she thinks looks and/or fits better.

[000128] Optionally, she can signal to the computer to rotate the image in any direction, and can look at it from different angles up or down as well, simply doing a rotation in the computer. This signaling can be conventional using for example a mouse, or can be using TV based sensing aspects of the invention such as employing camera 1070 also as shown in Fig. 1

for example. In another such case, she can reach out with her finger 1075 for example, and push or pull in a virtual manner the material, using the camera to sense the direction of her finger. Or she can touch herself at the points where the material should be taken up or let out, with the camera system sensing the locations of touch (typically requiring at least a stereo pair of cameras or other electro-optical system capable of determining where her fingertip is in 3D space. Note that a surrogate for the tried on dress in this case, could be the dress she has on, which is touched in the location desired on the displayed dress.

[000129] The standard size dress can then be altered and shipped to her, or the requisite modifications can be made in the CAD program, and a special dress cut out and sewed which would fit better.

[000130] A person can also use her hands via the TV cameras of the invention to determine hand location relative to the display to take clothes off a virtual manikin which could have a representation of any person real or imaginary. Alternatively she can remotely reach out using the invention to a virtual rack of clothes such as 1090, take an object off the rack, and put it on the manikin. This is particularly natural in near life-size representation, just like being in a store or other venue. This ability of the invention to bring real life experience to computer shopping and other activity that is a major advantage.

[000131] The user can also feel the texture of the cloth if suitable haptic devices are 15 available to the user, which can be activated remotely by the virtual clothing program, or other type of program.

[000132] Modifications of the invention herein disclosed will occur to persons skilled in the art, and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

**SUBSTITUTE SPECIFICATION**  
(Clean Copy)

MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

CROSS REFERENCE TO RELATED APPLICATIONS

[000133] This application is a continuation of U.S. Patent Application No. 12/700,055, filed February 4, 2010 (now U.S. Patent \_\_\_\_\_), which is a continuation of U.S. Patent Application No. 10/866,191, filed June 14, 2004, which is a continuation of U.S. Patent Application No. 09/433,297, filed November 3, 1999 (now U.S. Patent 6,750,848), which claims benefit of U.S. Provisional Application No. 60/107,652, filed November 9, 1998. These applications are hereby incorporated by reference.

REFERENCES TO RELATED APPLICATIONS BY THE INVENTORS

[000134] U.S. Patent Application No. 09/138,339, filed August 21, 1998.

[000135] U.S. Provisional Application No. 60/056,639, filed August 22, 1997.

[000136] U.S. Provisional Application No. 60/059,561, filed September 19, 1998.

[000137] Man Machine Interfaces: SN 08/290,516, filed 8/15/1994, and now USP 6,008,800.

[000138] Touch TV and Other Man Machine Interfaces: SN 08/496,908, filed 6/29/1995, and now USP 5,982,352.

[000139] Systems for Occupant Position Sensing: SN 08/968,114, filed 11/12/1997, now abandoned, which claims benefit of 60/031,256, filed 11/12/1996.

[000140] Target holes and corners: USSN 08/203,603, filed 2/28/1994, and 08/468,358 filed 6/6/1995, now USP 5,956,417 and USP 6,044, 183.



[000141] Vision Target Based Assembly: USSN 08/469,429, filed 6/6/1995, now abandoned; 08/469,907, filed 6/6/1995, now USP 6,301,763; 08/470,325, filed 6/6/1995, now abandoned; and 08/466,294, filed 6/6/1995, now abandoned.

[000142] Picture Taking Method and Apparatus: Provisional Application no. 60/133,671, filed May 11, 1998.

[000143] Methods and Apparatus for Man Machine Interfaces and Related Activity: Provisional Application no. 60/133,673 filed May 11, 1998.

[000144] Camera Based Man-Machine Interfaces: Provisional Patent Application no. 60/142,777, filed July 8, 1999.

[000145] The copies of the disclosure of the above referenced applications are incorporated herein by reference.

### BACKGROUND OF THE INVENTION

[000146] Field of the Invention

[000147] The invention relates to simple input devices for computers, particularly, but not necessarily, intended for use with 3-D graphically intensive activities, and operating by optically sensing object or human positions and/or orientations. The invention in many preferred embodiments, uses real time stereo photogrammetry using single or multiple TV cameras whose output is analyzed and used as input to a personal computer, typically to gather data concerning the 3D location of parts of, or objects held by, a person or persons.

[000148] This continuation application seeks to provide further detail on useful embodiments for computing. One embodiment is a keyboard for a laptop computer (or stand alone keyboard for any computer) that incorporates digital TV cameras to look at points on,

typically, the hand or the finger, or objects held in the hand of the user, which are used to input data to the computer. It may also or alternatively, look at the head of the user as well.

[000149] Both hands or multiple fingers of each hand, or an object in one hand and fingers of the other can be simultaneously observed, as can alternate arrangements as desired.

#### DESCRIPTION OF RELATED ART

[000150] My referenced co-pending applications incorporated herein by reference discuss many prior art references in various pertinent fields, which form a background for this invention.

#### BRIEF DESCRIPTION OF FIGURES

[000151] Fig. 1 illustrates a laptop or other computer keyboard with cameras according to the invention located on the keyboard surface to observe objects such as fingers and hands overhead of the keyboard.

[000152] Fig. 2 illustrates another keyboard embodiment using special datums or light sources such as LEDs.

[000153] Fig. 3 illustrates a further finger detection system for laptop or other computer input.

[000154] Fig. 4 illustrates learning, amusement, monitoring, and diagnostic methods and devices for the crib, playpen and the like.

[000155] Fig. 5 illustrates a puzzle toy for young children having cut out wood characters according to the invention.

[000156] Fig. 6 illustrates an improved handheld computer embodiment of the invention, in which the camera or cameras may be used to look at objects, screens and the like as well as look at the user along the lines of Fig. 1.

[000157] Figs. 7A-B illustrate new methods for internet commerce and other activities involving remote operation with 3D virtual objects display.

### DESCRIPTION OF THE INVENTION

#### Figure 1

[000158] A laptop (or other) computer keyboard based embodiment is shown in Fig. 1. In this case, a stereo pair of cameras 100 and 101 located on each side of the keyboard are used, desirably having cover windows 103 and 104 mounted flush with the keyboard surface 102. The cameras are preferably pointed obliquely inward at angles  $\Phi$  toward the center of the desired work volume 170 above the keyboard. In the case of cameras mounted at the rear of the keyboard (toward the display screen), these cameras are also inclined to point toward the user at an angle as well.

[000159] Alternate camera locations may be used such as the positions of cameras 105 and 106, on upper corners of screen housing 107 looking down at the top of the fingers (or hands, or objects in hand or in front of the cameras), or of cameras 108 and 109 shown.

[000160] One of the referenced embodiments of the invention is to determine the pointing direction vector 160 of the user's finger (for example pointing at an object displayed on screen 107), or the position and orientation of an object held by the user. Alternatively, finger position data can be used to determine gestures such as pinch or grip, and other examples of relative juxtaposition of objects with respect to each other, as has been described in co-pending referenced applications. Positioning of an object or portions (such as hands or fingers of a doll) is also of use, though more for use with larger keyboards and displays.

[000161] In one embodiment, shown in Fig. 2, cameras such as 100/101 are used to simply look at the tip of a finger 201 (or thumb) of the user, or an object such as a ring 208 on the finger. Light from below, such as provided by single central light 122 can be used to illuminate the finger that typically looks bright under such illumination.

[000162] It is also noted that the illumination is directed or concentrated in an area where the finger is typically located such as in work volume 170. If the light is of sufficient spectral content, the natural flesh tone of the finger can be observed – and recognized by use of the color TV cameras 100/101.

[000163] As is typically the case, the region of the overlapping cameras viewing area is relatively isolated to the overlapping volumetric zone of their fields 170 shown due to focal lengths of their lenses and the angulation of the camera axes with respect to each other. This restricted overlap zone helps mitigate against unwanted matches in the two images due to information generated outside the zone of overlap. Thus there are no significant image matches found of other objects in the room, since the only flesh-toned object in the zone is typically the finger or fingers of the user. Or alternatively, for example, the user's hand or hands. Similarly objects or targets thereon can be distinguished by special colors or shapes.

[000164] If desired, or required, motion of the fingers can be also used to further distinguish their presence vis-a-vis any static background. If for example, by subtraction of successive camera frames, the image of a particular object is determined to have moved it is determined that this is likely the object of potential interest which can be further analyzed directly to determine if is the object of interest.

[000165] In case of obscuration of the fingers or objects in the hand, cameras in additional locations such as those mentioned above, can be used to solve for position if the view of one or more cameras is obscured.

[000166] The use of cameras mounted on both the screen and the keyboard allows one to deal with obscurations that may occur and certain objects may or may not be advantageously delineated in one view or the other.

[000167] In addition, it may be in many cases desirable to have a datum on the top of the finger as opposed to the bottom because on the bottom, it can get in the way of certain activities. In this case the sensors are required on the screen looking downward or in some other location such as off the computer entirely and located overhead has been noted in previous application.

[000168] To determine finger location, a front end processor like that described in the target holes and corners co-pending application reference incorporated USSN 08/203,603 and 08/468,358 can be used to also allow the finger shape as well as color to be detected.

[000169] Finger gestures comprising a sequence of finger movements can also be detected by analyzing sequential image sets such as the motion of the finger, or one finger with respect to another such as in pinching something can be determined. Cameras 100 and 101 have been shown at the rear of the keyboard near the screen or at the front. They may mount in the middle of the keyboard or any other advantageous location.

[000170] The cameras can also see one's fingers directly, to allow typing as now, but without the physical keys. One can type in space above the plane of the keyboard (or in this case plane of the cameras). This is useful for those applications where the keyboard of conventional style is too big (e.g., the hand held computer of Fig. 6).

[000171]     Figure 2

[000172]     It is also desirable for fast reliable operation to use retro-reflective materials and other materials to augment the contrast of objects used in the application. For example, a line target such as 200 can be worn on a finger 201, and advantageously can be located if desired between two joints of the finger as shown. This allows the tip of the finger to be used to type on the keyboard without feeling unusual – the case perhaps with target material on tip of the finger.

[000173]     The line image detected by the camera can be provided also by a cylinder such as retroreflective cylinder 208 worn on the finger 201 which effectively becomes a line image in the field of view of each camera (assuming each camera is equipped with a sufficiently coaxial light source, typically one or more LEDs such as 210 and 211), can be used to solve easily using the line image pairs with the stereo cameras for the pointing direction of the finger that is often a desired result. The line, in the stereo pair of images provides the pointing direction of the finger, for example pointing at an object displayed on the screen 140 of the laptop computer 138.

[000174]     Figure 3

[000175]     It is also possible to have light sources on the finger that can be utilized such as the 2 LED light sources shown in Fig. 3. This can be used with either TV camera type sensors or with PSD type analog image position sensors as disclosed in references incorporated.

[000176]     In particular the ring mounted LED light sources 301 and 302 can be modulated at different frequencies that can be individually discerned by sensors imaging the sources on to a respective PSD detector. Alternatively, the sources can simply be turned on and off at different times such that the position of each point can be independently found allowing the pointing

direction to be calculated from the LED point data gathered by the stereo pair of PSD based sensors.

[000177] The “natural interface keyboard” here described can have cameras or other sensors located at the rear looking obliquely outward toward the front as well as inward so as to have their working volume overlap in the middle of the keyboard such as the nearly full volume over the keyboard area is accommodated.

[000178] Clearly larger keyboards can have a larger working volume than one might have on a laptop. The pair of sensors used can be augmented with other sensors mounted on the screen housing. It is noted that the linked dimension afforded for calibration between the sensors located on the screen and those on the keyboard is provided by the laptop unitary construction.

[000179] One can use angle sensing means such as a rotary encoder for the laptop screen tilt. Alternatively, cameras located on the screen can be used to image reference points on the keyboard as reference points to achieve this. This allows the calibration of the sensors mounted fixedly with respect to the screen with respect to the sensors and keyboard space below. It also allows one to use stereo pairs of sensors that are not in the horizontal direction (such as 101/102) but could for example be a camera sensor such as 100 on the keyboard coupled with one on the screen, such as 106.

[000180] Knowing the pointing angles of the two cameras with respect to one another allows one to solve for the 3D location of objects from the matching of the object image positions in the respective camera fields.

[000181] As noted previously, it is also of interest to locate a line or cylinder type target on the finger between the first and second joints. This allows one to use the fingertip for the

keyboard activity but by raising the finger up, it can be used as a line target capable of solving for the pointed direction for example.

[000182] Alternatively one can use two point targets on the finger such as either retroreflective datums, colored datums such as rings or LED light sources that can also be used with PSD detectors which has also been noted in Fig. 2.

[000183] When using the cameras located for the purpose of stereo determination of the position of the fingers from their flesh tone images it is useful to follow the preprocessing capable of processing data obtained from the cameras in order to look for the finger. This can be done on both color basis and on the basis of shape as well as motion.

[000184] In this invention, I have shown the use of not only cameras located on a screen looking downward or outward from the screen, but also cameras that can be used instead of or in combination with those on the screen placed essentially on the member on which the keyboard is incorporated. This allows essentially the keyboard to mounted cameras which are preferably mounted flush with the keyboard surface to be unobtrusive, and yet visually be able to see the users fingers, hands or objects held by the user and in some cases, the face of the user.

[000185] This arrangement is also useful for 3D displays, for example where special synchronized glasses (e.g., the “Crystal Eyes” brand often used with Silicon Graphics work stations) are used to alternatively present right and left images to each eye. In this case the object may appear to be actually in the workspace 170 above the keyboard, and it may be manipulated by virtually grasping (pushing, pulling, etc.) it, as has been described in co-pending applications.

[000186] Figure 4: Baby Learning and Monitoring System



[000187] A baby's reaction to the mother (or father) and the mother's analysis of the baby's reaction is very important. There are many gestures of babies apparently indicated in child psychology as being quite indicative of various needs, wants, or feelings and emotions, etc. These gestures are typically made with the baby's hands.

[000188] Today this is done and learned entirely by the mother being with the baby. However with an Electro-optical sensor based computer system, such as that described in co-pending applications located proximate to or even in the crib (for example), one can have the child's reactions recorded, not just in the sense of a video tape which would be too long and involved for most to use, but also in terms of the actual motions which could be computer recorded and analyzed also with the help of the mother as to what the baby's responses were. And such motions, combined with other audio and visual data can be very important to the baby's health, safety, and learning.

[000189] Consider for example crib 400 with computer 408 having LCD monitor 410 and speaker 411 and camera system (single or stereo) 420 as shown, able to amuse or inform baby 430, while at the same time recording (both visually, aurally, and in movement detected position data concerning parts of his body or objects such as rattles in his hand) his responses for any or all of the purposes of diagnosis of his state of being, remote transmission of his state, cues to various programs or images to display to him or broadcast to others, or the like.

[000190] For one example, baby's motions could be used to signal a response from the TV either in the absence of the mother or with the mother watching on a remote channel. This can even be over the Internet if the mother is at work.

[000191] For example, a comforting message could come up on the TV from the mother that could be prerecorded (or alternatively could actually be live with TV cameras in the mother's or father's workplace for example on a computer used by the parent) to tell the baby something reassuring or comfort the baby or whatever. Indeed the parent can be monitored using the invention and indicate something back or even control a teleoperator robotic device to give a small child something to eat or drink for example. The same applies to a disabled person.

[000192] If the father or mother came up on the screen, the baby could wave at it, move its head or "talk" to it but the hand gestures may be the most important.

[000193] If the mother knows what the baby is after, she can talk to baby or say something, or show something that the baby recognizes such as a doll. After a while, looking at this live one can then move to talking to the baby from some prerecorded data.

[000194] What other things might we suppose? The baby for example knows to puts its hand on the mother's cheek to cause the mother to turn to it. The baby also learns some other reflexes when it is very young that it forgets when it gets older. Many of these reflexes are hand movements, and are important in communicating with the remote TV based mother representation, whether real via telepresence or from CD Rom or DVD disk (or other media, including information transmitted to the computer from afar) and for the learning of the baby's actions.

[000195] Certainly just from the making the baby feel good point-of-view, it would seem like certain motherly (or fatherly, etc.) responses to certain baby actions in the form of words and images would be useful. This stops short of physical holding of the baby which is often needed, but could act as a stop gap to allow the parents to get another hour's sleep for example.

[000196] As far as the baby touching things, I've discussed in other applications methods for realistic touch combined with images. This leads to a new form of touching crib mobiles that could contain video imaged and or be imaged themselves – plus if desired – touched in ways that would be far beyond any response that you could get from a normal mobile.

[000197] For example, let us say there is a targeted (or otherwise TV observable) mobile 450 in the crib above the baby. Baby reaches up and touches a piece of the mobile which is sensed by the TV camera system (either from the baby's hand position, the mobile movement, or both, and a certain sound is called up by the computer, a musical note for example. Another piece of the mobile and another musical note. The mobile becomes a musical instrument for the baby that could play either notes or chords or complete passages, or any other desired programmed function.

[000198] The baby can also signal things. The baby can signal using agitated movements would often mean that it's unhappy. This could be interpreted using learned movement signatures and artificial intelligence as needed by the computer to call for mother even if the baby wasn't crying. If the baby cries, that can be picked up by microphone 440, recognized using a voice recognition system along the lines of that used in IBM Via Voice commercial product for example. And even the degree of crying can be analyzed to determine appropriate action.

[000199] The computer could also be used to transmit information of this sort via the internet email to the mother who could even be at work. And until help arrives in the form of mother intervention or whatever, the computer could access a program that could display on a screen for the baby things that the baby likes and could try to soothe the baby through either

images of familiar things, music or whatever. This could be useful at night when parents need sleep, and anything that would make the baby feel more comfortable would help the parents.

[000200] It could also be used to allow the baby to input to the device. For example, if the baby was hungry, a picture of the bottle could be brought up on the screen. The baby then could yell for the bottle. Or if the baby needed his diaper changed, perhaps something reminiscent of that. If the baby reacts to such suggestions of his problem, this gives a lot more intelligence as to why he is crying and while mothers can generally tell right away, not everyone else can. In other words, this is pretty neat for babysitters and other members of the household so they can act more intelligently on the signals the baby is providing.

[000201] Besides in the crib, the system as described can be used in conjunction with a playpen, hi-chair or other place of baby activity.

[000202] As the child gets older, the invention can further be used also with more advanced activity with toys, and to take data from toy positions as well. For example, blocks, dolls, little cars, and moving toys even such as trikes, scooters, drivable toy cars and bikes with training wheels.

[000203] The following figure illustrates the ability of the invention to learn, and thus to assist in the creation of toys and other things.

[000204] Figure 5: Learning Puzzle Roy

[000205] Disclosed in Fig. 5 is a puzzle toy 500 where woodcut animals such as bear 505 and lion 510 are pulled out with handle such as 511. The child can show the animal to the camera and a computer 530 with TV camera (or cameras) 535 can recognize the shape as the animal, and provide a suitable image and sounds on screen 540.

[000206] Alternatively, and more simply, a target, or targets on the back of the animal can be used such as triangle 550 on the back of lion 511. In either case the camera can solve for the 3D, and even 5 or 6D position and orientation of the animal object, and cause it to move accordingly on the screen as the child maneuvers it. The child can hold two animals, one in each hand and they can each be detected, even with a single camera, and be programmed in software to interact as the child wishes (or as he learns the program).

[000207] This is clearly for very young children of two or three years of age. The toys have to be large so they can't be swallowed.

[000208] With the invention in this manner, one can make a toy of virtually anything, for example a block. Just hold this block up, teach the computer/camera system the object and play using any program you might want to represent it and its actions. To make this block known to the system, the shape of the block, the color of the block or some code on the block can be determined. Any of those items could tell the camera which block it was, and most could give position and orientation if known.

[000209] At that point, an image is called up from the computer representing that particular animal or whatever else the block is supposed to represent. Of course this can be changed in the computer to be a variety of things if this is something that is acceptable to the child. It could certainly be changed in size such as a small lion could grow into a large lion. The child could probably absorb that more than a lion changing into a giraffe for example since the block wouldn't correspond to that. The child can program or teach the system any of his blocks to be the animal he wants and that might be fun.

[000210] For example, he or the child's parent could program a square to be a giraffe where as a triangle would be a lion. Maybe this could be an interesting way to get the child to learn his geometric shapes!

[000211] Now the basic block held up in front of the camera system could be looked at just for what it is. As the child may move the thing toward or away from the camera system, one may get a rough sense of depth from the change in shape of the object. However this is not so easy as the object changes in shape due to any sort of rotations.

[000212] Particularly interesting then is to also sense the rotations if the object so that the animal can actually move realistically in 3 Dimensions on the screen. And perhaps having the de-tuning of the shape of the movement so that the child's relatively jerky movements would not appear jerky on the screen or would not look so accentuated. Conversely of course, you can go the other way and accentuate the motions.

[000213] This can, for example, be done with a line target around the edge of the object is often useful for providing position or orientation information to the TV camera based analysis software, and in making the object easier to see in reflective illumination.

[000214] Aid to speech recognition

[000215] The previous co-pending application entitled "Useful man machine interfaces and applications" referenced above, discussed the use of persons movements or positions to aid in recognizing the voice spoken by the person.

[000216] In one instance, this can be achieved by simply using ones hand to indicate to the camera system of the computer that the voice recognition should start (or stop, or any other function, such as a paragraph or sentence end, etc.).

[000217] Another example is to use the camera system of the invention to determine the location of the persons head (or other part), from which one can instruct a computer to preferentially evaluate the sound field in phase and amplitude of two or more spaced microphones to listen from that location – thus aiding the pickup of speech – which often times is not able to be heard well enough for computer based automatic speech recognition to occur.

[000218] Digital interactive TV

[000219] As you watch TV, data can be taken from the camera system of the invention and transmitted back to the source of programming. This could include voting on a given proposition by raising your hand for example, with your hand indication transmitted. Or you could hold up 3 fingers, and the count of fingers transmitted. Or in a more extreme case, your position, or the position of an object or portion thereof could be transmitted – for example you could buy a coded object – whose code would be transmitted to indicate that you personally (having been pre-registered) had transmitted a certain packet of data.

[000220] If the programming source can transmit individually to you (not possible today, but forecast for the future), then much more is possible. The actual image and voice can respond using the invention to positions and orientations of persons or objects in the room – just as in the case of prerecorded data – or one to one internet connections. This allows group activity as well.

[000221] In the extreme case, full video is transmitted in both directions and total interaction of users and programming sources and each other becomes possible.

[000222] An interim possibility using the invention is to have a program broadcast to many, which shifts to prerecorded DVD disc or the like driving a local image, say when your hand input causes a signal to be activated.

[000223]     Handwriting authentication

[000224]     A referenced co-pending application illustrated the use of the invention to track the position of a pencil in three dimensional space such that the point at which the user intends the writing point to be at, can be identified and therefore used to input information, such as the intended script.

[000225]     As herein disclosed, this part of the invention can also be used for the purpose of determining whether or not a given person's handwriting or signature is correct.

[000226]     For example, consider authentication of an Internet commercial transaction. In this case, the user simply writes his name or address and the invention is used to look at the movements of his writing instrument and determine from that whether or not the signature is authentic. (A movement of one or more of his body parts might also or alternatively be employed). For example a series of frames of datum location on his pen can be taken, to determine one or more positions on it as a function of time, even to include calculating of its pointing direction, from a determined knowledge in three axes of two points along the line of the pen axis. In this case a particular pointing vector sequence "signature" would be learned for this person, and compared to later signatures.

[000227]     What is anticipated here is that in order to add what you might call the confirming degree of authenticity to the signature, it may not be necessary to track the signature completely. Rather one might only determine that certain aspects of the movement of the pencil are the authentic ones. One could have people write using any kind of movement, not just their signature having their name. The fact is that people are mostly used to writing their name and it would be assumed that that would be it. However, it could well be that the computer asks the user to write



something else that they would then write and that particular thing would be stored in the memory.

[000228] Optionally, one's voice could be recognized in conjunction with the motion signature to add further confirmation.

[000229] This type of ability for the computer system at the other end of the Internet to query a writer to write a specific thing in a random fashion adds a degree of cryptographic capacity to the invention. In other words, if I can store the movements in my hand to write different things, then clearly this has some value.

[000230] The important thing though is that some sort of representation of the movements of the pencil or other instrument can be detected using the invention and transmitted.

[000231] Figure 6: Hand Held Computer

[000232] Fig. 6 illustrates an improved handheld computer embodiment of the invention. For example, Fig. 8 of the provisional application referenced above entitled "camera based man machine interfaces and applications" illustrates a basic hand held device and which is a phone, or a computer or a combination thereof, or alternatively to being hand held, can be a wearable computer for example on one's wrist.

[000233] In this embodiment, we further disclose the use of this device as a computer, with a major improvement being the incorporation of a camera of the device optionally in a position to look at the user, or an object held by the user- along the lines of Fig. 1 of the instant disclosure for example.

[000234] Consider hand held computer 901 of Fig. 6, incorporating a camera 902 which can optionally be rotated about axis 905 so as to look at the user or a portion thereof such as

finger 906, or at objects at which it is pointed. Optionally, and often desirably, a stereo pair of cameras to further include camera 910 can also be used. It too may rotate, as desired. Alternatively fixed cameras can be used as in Fig. 1, and Fig. 8 of the referenced co-pending application, when physical rotation is not desired, for ruggedness, ease of use, or other reasons (noting that fixed cameras have fixed fields of view, which limit versatility in some cases).

[000235] When aimed at the user, as shown, it can be used, for example, to view and obtain images of:

[000236] Ones self-facial expression etc., also for image reasons, id etc., combined effect.

[000237] Ones fingers (any or all), one finger to other and the like. This in turn allows conversing with the computer in a form of sign language which can replace the keyboard of a conventional computer.

[000238] One or more objects in one's hand. Includes a pencil or pen, and thus can be used rather than having a special touch screen and pencil if the pencil itself is tracked as disclosed in the above figure. It also allows small children to use the device, and those who cannot hold an ordinary stylus.

[000239] One's gestures.

[000240] The camera 902 (and 910 if used, and if desired), can also be optionally rotated and used to viewpoints in space ahead of the device, as shown in dotted lines 902a. In this position for example it can be used for the purposes described in the previous application. It can also be used to observe or point at (using optional laser pointer 930) points such as 935 on a wall, or a mounted LCD or projection display such as 940 on a wall or elsewhere such as on the back of an airline seat.

[000241] With this feature of the invention, there is no requirement to carry a computer display with you as with a infrared connection (not shown) such as known in the art one can also transmit all normal control information to the display control computer 951. As displays become ubiquitous, this makes increasing sense - otherwise the displays get bigger the computers smaller trend doesn't make sense if they need to be dragged around together. As one walks into a room, one uses the display or displays in that room (which might themselves be interconnected).

[000242] The camera unit 902 can sense the location of the display in space relative to the handheld computer, using for example the four points 955-958 on the corners of the display as references. This allows the handheld device to become an accurate pointer for objects displayed on the screen, including control icons. And it allows the objects on the screen to be sensed directly by the camera- if one does not have the capability to spatially synchronize and coordinate the display driver with the handheld computer.

[000243] The camera can also be used to see gestures of others, as well as the user, and to acquire raw video images of objects in its field.

[000244] A reverse situation also exists where the cameras can be on the wall mounted display, such as cameras 980 and 981 can be used to look at the handheld computer module 901 and determine its position and orientation relative to the display.

[000245] Note that a camera such as 902, looking at you the user, if attached to hand held unit, always has reference frame of that unit. If one works with a screen on a wall, one can aim the handheld unit with camera at it, and determine its reference frame to the handheld unit. Also can have two cameras operating together, one looking at wall thing, other at you (as 902 and 902a) in this manner, one can dynamically compare ref frames of the display to the human input

means in determining display parameters. This can be done in real time, and if so one can actually wave the handheld unit around while still inputting accurate data to the display using ones fingers, objects or whatever.

[000246] Use of a laser pointer such as 930 incorporated into the handheld unit has also been disclosed in the referenced co-pending applications. For example, a camera on the handheld computer unit such as 902 viewing in direction 902a would look at laser spot such as 990 (which might or might not have come from the computers own laser pointer 930) on the wall display say, and recognized by color and size/shape reference to edge of screen, and to projected spots on screen.

[000247] Figures 7A-B: Internet and Other Remote Applications

[000248] Fig. 7A illustrates new methods for internet commerce and other activities involving remote operation with 3D virtual objects displayed on a screen. This application also illustrates the ability of the invention to prevent computer vision eye strain.

[000249] Let us first consider the operation of the invention over the internet as it exists today in highly bandwidth limited form dependent on ordinary phone lines for the most part. In this case it is highly desirable to transmit just the locations or pointing vectors of portions (typically determined by stereo photo-grammetry of the invention) of human users or objects associated therewith to a remote location, to allow the remote computer 10 to modify the image or sound transmitted back to the user.

[000250] Another issue is the internet time delay, which can exist in varying degrees, and is more noticeable, the higher resolution of the imagery transmitted. In this case, a preferred arrangement is to have real time transmission of minimal position and vector data (using no more

bandwidth than voice), and to transmit back to the user, quasi stationary images at good resolution. Transmission of low resolution near real time images common in internet telephony today, does not convey the natural feeling desired for many commercial applications to now be discussed. As bandwidth becomes more plentiful these restrictions are eased.

[000251] Let us consider the problem posed of getting information from the internet of today. A user 1000 can go to a virtual library displayed on screen 1001 controlled by computer 1002 where one sees a group 1010 of books on stacks. Using the invention as described herein and incorporated referenced applications to determine my hand and finger locations, I the user, can point at a book such as 1014 in a computer sensed manner, or even reach out and “grab” a book, such as 1020 (dotted lines) apparently generated in 3D in front of me.

[000252] My pointing, or my reach and grab is in real time, and the vector (such as the pointing direction of ones finger at the book on the screen, or the position and orientation closing vectors of one’s forefinger and thumb to grab the 3D image 1020 of the book) indicating the book in question created is transmitted back by internet means to the remote computer 1030 which determines that I have grabbed the book entitled War and Peace from the virtual shelf. A picture of the book coming off the shelf is then generated using fast 3D graphical imagery such as the Merlin VR package available today from Digital Immersion company of Sudbury, Ontario. This picture (and the original picture of the books on the shelves) can be retransmitted over the internet at low resolution (but sufficient speed) to give a feeling of immediacy to the user. Or alternatively, the imagery can be generated locally at higher resolution using the software package resident in the local computer 1002 which receives key commands from the distant computer 1030.

[000253] After the book has been “received” by the user, it then can be opened automatically to the cover page for example under control of the computer, or the users 10 hands can pretend to open it, and the sensed hands instruct the remote (or local, depending on version) computer to do so. A surrogate book such as 1040 can also be used to give the user a tactile feel of a book, even though the real book in questions pages will be viewed on the display screen 1001. One difference to this could be if the screen 1001 depicting the books were life size, like real stacks. Then one might wish to go over to a surrogate book incorporating a separate display screen- just as one would in a real library, go to a reading table after removing a book from a stack.

[000254] Net Grocery stores have already appeared, and similar applications concern picking groceries off of the shelf of a virtual supermarket, and filling ones shopping cart. For that matter, any store where it is desired to show the merchandise in the very manner people are accustomed to seeing it, namely on shelves or racks, generally as one walks down an aisle, or fumbles through a rack of clothes for example. In each case, the invention, which also can optionally use voice input, as if to talk to a clothing sales person, can be used to monitor the person’s positions and gestures.

[000255] The invention in this mode can also be used to allow one to peruse much larger objects. For example, to buy a car (or walk through a house, say) over the internet, one can lift the hood, look inside, etc., all by using the invention to monitor the 3D position of your head or hands and move the image of the car presented accordingly. If the image is presented substantially life-size, then one can be monitored as one physically walks around the car in one’s room say, with the image changing accordingly. In other words just as today.

[000256] Note that while the image can be apparently life-size using virtual reality glasses, the natural movements one is accustomed to in buying a car are not present. This invention makes such a natural situation possible (though it can also be used with such glasses as well).

[000257] It is noted that the invention also comprehends adding a force based function to a feedback to your hands, such that it feels like you lifted the hood, or grabbed the book, say. For this purpose holding a surrogate object as described in co-pending applications could be useful, in this case providing force feedback to the object.

[000258] If one looks at internet commerce today, some big applications have turned out 10 to be clothes and books. Clothes are by far the largest expenditure item, and let's look closer at this.

[000259] Consider too a virtual mannequin, which can also have measurements of a remote shopper. For example, consider diagram 78, where a woman's measurements are inputted by known means such as a keyboard 1050 over the internet to a CAD program in computer 1055, which creates on display screen 1056 a 3D representation of a mannequin 1059 having the woman's shape in the home computer 1060 . As she selects a dress 1065 to try on, the dress which let's say comes in 10 sizes, 5 to 15, is virtually "tried on" the virtual mannequin and the woman 1070 looks at the screen 1056 and determines the fit of a standard size 12 dress. She can rapidly select larger or smaller sizes and decide which she thinks looks and/or fits better.

[000260] Optionally, she can signal to the computer to rotate the image in any direction, and can look at it from different angles up or down as well, simply doing a rotation in the computer. This signaling can be conventional using for example a mouse, or can be using TV based sensing aspects of the invention such as employing camera 1070 also as shown in Fig. 1

for example. In another such case, she can reach out with her finger 1075 for example, and push or pull in a virtual manner the material, using the camera to sense the direction of her finger. Or she can touch herself at the points where the material should be taken up or let out, with the camera system sensing the locations of touch (typically requiring at least a stereo pair of cameras or other electro-optical system capable of determining where her fingertip is in 3D space. Note that a surrogate for the tried on dress in this case, could be the dress she has on, which is touched in the location desired on the displayed dress.

[000261] The standard size dress can then be altered and shipped to her, or the requisite modifications can be made in the CAD program, and a special dress cut out and sewed which would fit better.

[000262] A person can also use her hands via the TV cameras of the invention to determine hand location relative to the display to take clothes off a virtual manikin which could have a representation of any person real or imaginary. Alternatively she can remotely reach out using the invention to a virtual rack of clothes such as 1090, take an object off the rack, and put it on the manikin. This is particularly natural in near life-size representation, just like being in a store or other venue. This ability of the invention to bring real life experience to computer shopping and other activity that is a major advantage.

[000263] The user can also feel the texture of the cloth if suitable haptic devices are 15 available to the user, which can be activated remotely by the virtual clothing program, or other type of program.



[000264] Modifications of the invention herein disclosed will occur to persons skilled in the art, and all such modifications are deemed to be within the scope of the invention as defined by the appended claims.

9031486

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	135873.152187-US
		Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

**Secrecy Order 37 CFR 5.2**

<input type="checkbox"/>	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
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**Inventor Information:**

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Timothy	R.	Pryor			
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						
City	Sylvania	State/Province	OH	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	4148 Stonehenge Drive					
Address 2						
City	Sylvania	State/Province	OH			
Postal Code	43560	Country	US			
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.						Add

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
<input type="checkbox"/> An Address is being provided for the correspondence information of this application.			
Customer Number	24335		
Email Address	patents@wnj.com	Add Email	Remove Email

**Application Information:**

Title of the Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS		
Attorney Docket Number	135873.152187-US	Small Entity Status Claimed	<input checked="" type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	7	Suggested Figure for Publication (if any)	1

<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

**Publication Information:**

<input type="checkbox"/>	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/>	<b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	24335		

**Domestic Benefit/National Stage Information:**

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	Pending		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation of	12700055	2010-02-04		
Prior Application Status	Abandoned		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
12700055	Continuation of	10866191	2004-06-14		
Prior Application Status	Patented		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
10866191	Continuation of	09433297	1999-11-03	6750848	2011-11-25
Prior Application Status	Expired		<a href="#">Remove</a>		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
09433297	non provisional of	60107652	1998-11-09		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.					<a href="#">Add</a>

**Foreign Priority Information:**

IPR2022-00090 - LGE

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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

			Remove
Application Number	Country <sup>i</sup>	Filing Date (YYYY-MM-DD)	Priority Claimed
			<input type="radio"/> Yes <input checked="" type="radio"/> No
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

## Authorization to Permit Access:

<input type="checkbox"/> Authorization to Permit Access to the Instant Application by the Participating Offices
<p>If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.</p> <p>In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.</p> <p>In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.</p>

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.
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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

<b>Applicant 1</b>	<input type="button" value="Remove"/>
<p>If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.</p>	
<input type="button" value="Clear"/>	
<input type="radio"/> Assignee	<input type="radio"/> Legal Representative under 35 U.S.C. 117
<input type="radio"/> Person to whom the inventor is obligated to assign.	<input type="radio"/> Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:	
Name of the Deceased or Legally Incapacitated Inventor : <input type="text"/>	
If the Applicant is an Organization check here. <input type="checkbox"/>	

Prefix	Given Name	Middle Name	Family Name	Suffix

<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province		
Country <sup>i</sup>		Postal Code		
Phone Number		Fax Number		
Email Address				

Additional Applicant Data may be generated within this form by selecting the Add button.	<input type="button" value="Add"/>
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## Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

<b>Assignee 1</b>
<p>Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).</p>
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<b>Application Data Sheet 37 CFR 1.76</b>	Attorney Docket Number	135873.152187-US
	Application Number	
Title of Invention	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS	

If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
<b>Mailing Address Information:</b>				
Address 1				
Address 2				
City		State/Province		
Country i	Postal Code			
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>

**Signature:**

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications					
Signature	/Vito A. Ciaravino/		Date (YYYY-MM-DD)	2013-03-19	
First Name	Vito	Last Name	Ciaravino	Registration Number	62749
Additional Signature may be generated within this form by selecting the Add button.				<input type="button" value="Add"/>	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	15298895
<b>Application Number:</b>	13714748
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Rebecca A. Becker/Nancy Gravelin
<b>Filer Authorized By:</b>	Rebecca A. Becker
<b>Attorney Docket Number:</b>	135873.152187-US
<b>Receipt Date:</b>	19-MAR-2013
<b>Filing Date:</b>	14-DEC-2012
<b>Time Stamp:</b>	15:44:59
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Missing_Parts_152187.pdf	226784 <small>8cfb4da481c9ad89d60ab640bf6a92b7bc1450b3</small>	no	55

### Warnings:

### Information:

IPR2022-00090 - LGE

Ex. 1002 - Page 116



2	Application Data Sheet	ADS.pdf	1433192 45b361239b9de8f49f975cd77e067d9fe2b61bdb	no	6
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	1659976
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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

**PATENT APPLICATION FEE DETERMINATION RECORD**

Substitute for Form PTO-875

Application or Docket Number  
13/714,748

**APPLICATION AS FILED - PART I**

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	20 minus 20 = *	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 = *	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))		

\* If the difference in column 1 is less than zero, enter "0" in column 2.

**SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	70
N/A	300
N/A	360
x 40 =	0.00
x 210 =	0.00
	0.00
	0.00
<b>TOTAL</b>	<b>730</b>

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
<b>TOTAL</b>	

**APPLICATION AS AMENDED - PART II**

(Column 1) (Column 2) (Column 3)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(j))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

**SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(j))	*	Minus	**	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=
	Application Size Fee (37 CFR 1.16(s))				
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

**OR OTHER THAN SMALL ENTITY**

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
<b>TOTAL ADD'L FEE</b>	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

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Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/714,748, 12/14/2012, 2691, 533, 135873.152187-US, 20, 3

CONFIRMATION NO. 3254

UPDATED FILING RECEIPT



24335
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Date Mailed: 03/29/2013

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Inventor(s) Timothy R. Pryor, Sylvania, OH;

Applicant(s) Timothy R. Pryor, Sylvania, OH;

Power of Attorney: None

Domestic Priority data as claimed by applicant
This application is a CON of 12/700,055 02/04/2010
which is a CON of 10/866,191 06/14/2004 ABN
which is a CON of 09/433,297 11/03/1999 PAT 6750848
which claims benefit of 60/107,652 11/09/1998

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None. Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 01/14/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US 13/714,748

Projected Publication Date: 07/04/2013

Non-Publication Request: No

Early Publication Request: No

\*\* SMALL ENTITY \*\*

**Title**

MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

**Preliminary Class**

345

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13714748
	Filing Date		2012-12-14
	First Named Inventor	Timothy R. Pryor	
	Art Unit		2691
	Examiner Name		
	Attorney Docket Number		135873.152187-US

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3909002		1974-09-30	Levy	
	2	4219847		1980-08-26	Pinkney et al	
	3	4339798		1982-07-13	Hedges et al	
	4	4631676		1986-12-23	Pugh	
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Attorney Docket Number		135873.152187-US

	42	6252598		2001-06-26	Segen	
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13714748
	Filing Date	2012-12-14
	First Named Inventor	Timothy R. Pryor
	Art Unit	2691
	Examiner Name	
	Attorney Docket Number	135873.152187-US

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	Art Unit		2691
	Examiner Name		
	Attorney Docket Number		135873.152187-US

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Application Number	13714748		
Filing Date	2012-12-14		
First Named Inventor	Timothy R. Pryor		
Art Unit	2691		
Examiner Name			
Attorney Docket Number	135873.152187-US		

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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Name/Print	Vito A. Ciaravino	Registration Number	62749

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<b>EFS ID:</b>	15445289
<b>Application Number:</b>	13714748
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Filer Authorized By:</b>	Vito Anthony Ciaravino
<b>Attorney Docket Number:</b>	135873.152187-US
<b>Receipt Date:</b>	05-APR-2013
<b>Filing Date:</b>	14-DEC-2012
<b>Time Stamp:</b>	16:05:26
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	613828 <small>22c61e74f505c003e1661a5067cfbc0e0c8a946b</small>	no	9

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IPR2022-00090 - LGE

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**New International Application Filed with the USPTO as a Receiving Office**

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor : Timothy R. Pryor  
App. No. : 13/714,748  
Filing Date : December 14, 2012  
For : MORE USEFUL MAN MACHINE INTERFACES AND  
APPLICATIONS  
Attorney Docket No. : 135873.152187-001

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**PRELIMINARY AMENDMENT**

Before examination, please amend the above identified patent application as set forth on the following pages.

### CLAIMS

1. through 20. (Canceled).

21. (New) A computer implemented method comprising:

providing a light source adapted to direct illumination through a work volume above the light source;

providing a camera oriented to observe a gesture performed in the work volume, the camera being fixed relative to the light source; and

determining, using the camera, the gesture performed in the work volume and illuminated by the light source.

22. (New) The method according to claim 21 wherein the light source includes a light emitting diode.

23. (New) The method according to claim 21 wherein the light source includes a plurality of light emitting diodes.

24. (New) The method according to claim 21 wherein detecting a gesture includes analyzing sequential images of the camera.

25. (New) The method according to claim 21 wherein the detected gesture includes at least one of a pinch gesture, a pointing gesture, and a grip gesture.

26. (New) The method according to claim 21 further including determining the pointing direction of a finger in the work volume.

27. (New) The method according to claim 21 further including providing a target positioned on a user that is viewable in the work volume.

28. (New) The method according to claim 21 further including determining the three-dimensional position of a point on a user.

29. (New) The method according to claim 21 wherein the camera and the light source are positioned in fixed relation relative to a keypad.

30. (New) The method according to claim 29 the camera, the light source and the keypad form part of a laptop computer.

31. (New) A computer apparatus comprising:  
a light source adapted to illuminate a human body part within a work volume generally above the light source;

a camera in fixed relation relative to the light source and oriented to observe a gesture performed by the human body part in the work volume; and

a processor adapted to determine the gesture performed in the work volume and illuminated by the light source based on the camera output.

32. (New) The computer apparatus of claim 31 further including a display and a keyboard, wherein the work volume is above the keyboard and in front of the display.

33. (New) The computer apparatus of claim 32 wherein the display is pivotable relative to the keyboard.

34. (New) The computer apparatus of claim 31 wherein the light source includes a light emitting diode.

35. (New) The computer apparatus of claim 31 wherein the light source includes a plurality of light emitting diodes.

36. (New) The computer apparatus of claim 32 wherein the display includes a three-dimensional display.

37. (New) The computer apparatus of claim 31 further including a target that is viewable by the camera when in the work volume.

38. (New) The computer apparatus of claim 31 wherein the determined gesture includes a pinch gesture.

39. (New) The computer apparatus of claim 31 wherein the determined gesture includes a pointing gesture.

40. (New) The computer apparatus of claim 31 wherein the determined gesture includes a grip gesture.

41. (New) A computer implemented method comprising:  
providing a camera oriented to observe a gesture performed in a work volume above the camera;  
providing a light source in fixed relation relative to the camera and adapted to direct illumination through the work volume; and  
detecting, using the camera, a gesture performed by at least one of a user's fingers and a user's hand in the work volume.

42. (New) The method according to claim 41 wherein the light source includes a light emitting diode.

43. (New) The method according to claim 41 wherein the light source includes a plurality of light emitting diodes.

44. (New) The method according to claim 41 wherein detecting a gesture includes analyzing sequential images of the camera.

45. (New) The method according to claim 41 wherein the detected gesture includes at least one of a pinch gesture, a pointing gesture, and a grip gesture

46. (New) The method according to claim 41 further including determining the pointing direction of one of the user's fingers using the first and second cameras.

47. (New) The method according to claim 41 further including providing a target positioned on the user that is viewable by the camera.

48. (New) The method according to claim 41 further including determining the three-dimensional position of a point on at least one of the user's hand and the user's fingers.

49. (New) The method according to claim 41 further including providing a three-dimensional display viewable by the user.

50. (New) The method according to claim 41 wherein the camera and the light source are positioned in fixed relation relative to a keypad.

Inventor : Timothy R. Pryor  
App. No. : 13/714,748  
Page : 6

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REMARKS

Claims 21-50 are pending. Claims 1-20 are canceled, and claims 21-50 are added to more particularly point out and distinctly claim the subject matter Applicant regards as the invention. The Examiner is respectfully requested to consider this preliminary amendment when examining the application.

Respectfully submitted,

TIMOTHY R. PRYOR

By: Warner Norcross & Judd LLP

/Vito A. Ciaravino/

Vito A. Ciaravino  
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900 Fifth Third Center  
111 Lyon Street, N.W.  
Grand Rapids, MI 49503-2487  
(616) 752-2709

9218371

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13714748
<b>Filing Date:</b>	14-Dec-2012
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Attorney Docket Number:</b>	135873.152187-US

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Claims in excess of 20	2202	10	40	400

**Miscellaneous-Filing:**

**Petition:**

**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

**Extension-of-Time:**

IPR2022-00090 - LGE

Ex. 1002 - Page 139

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>400</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	16083923
<b>Application Number:</b>	13714748
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Filer Authorized By:</b>	Vito Anthony Ciaravino
<b>Attorney Docket Number:</b>	135873.152187-US
<b>Receipt Date:</b>	19-JUN-2013
<b>Filing Date:</b>	14-DEC-2012
<b>Time Stamp:</b>	14:54:10
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	\$400
RAM confirmation Number	1357
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part (.zip) (if appl.)	Pages (if appl.)
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1		Prelim_Amend_152187.pdf	26389 f/bf03d728e9851cad158c23d953f641e0356919	yes	6
<b>Multipart Description/PDF files in .zip description</b>					
		<b>Document Description</b>	<b>Start</b>	<b>End</b>	
		Preliminary Amendment	1	1	
		Claims	2	5	
		Applicant Arguments/Remarks Made in an Amendment	6	6	
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	29857 27467eafcb228f1a2323526094fc90294d07499e	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			56246		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/714,748</b>	Filing Date <b>12/14/2012</b>	<input type="checkbox"/> To be Mailed
-----------------------------------------------------------------------------------	---------------------------------------------------	----------------------------------	---------------------------------------

ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	<b>06/19/2013</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	* 30	Minus	** 20 = 10	X \$40 =	400
	Independent <small>(37 CFR 1.16(h))</small>	* 3	Minus	***3 = 0	X \$210 =	0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	<b>400</b>

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	** =	X \$ =	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	*** =	X \$ =	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LDRC  
/ADRIANE WINSTON/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 4 columns: APPLICATION NUMBER (13/714,748), FILING OR 371(C) DATE (12/14/2012), FIRST NAMED APPLICANT (Timothy R. Pryor), ATTY. DOCKET NO./TITLE (135873.152187-0001)

CONFIRMATION NO. 3254

PUBLICATION NOTICE

24335
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487



Title: MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

Publication No. US-2013-0169535-A1
Publication Date: 07/04/2013

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



NOTICE OF ALLOWANCE AND FEE(S) DUE

24335 7590 07/24/2013
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Table with 2 columns: EXAMINER (SHAW, PELING ANDREW), ART UNIT (2444), PAPER NUMBER

DATE MAILED: 07/24/2013

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

TITLE OF INVENTION: MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
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 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24335 7590 07/24/2013  
**WARNER NORCROSS & JUDD LLP**  
**INTELLECTUAL PROPERTY GROUP**  
 900 FIFTH THIRD CENTER  
 111 LYON STREET, N.W.  
 GRAND RAPIDS, MI 49503-2487

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/714,748	12/14/2012	Timothy R. Pryor	135873.152187-0001	3254

TITLE OF INVENTION: MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	10/24/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHAW, PELING ANDREW	2444	348-077000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1</p> <p>(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. _____ 2</p> <p>_____ 3</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

5. **Change in Entity Status** (from status indicated above)

- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

---

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

---

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

24335 7590 07/24/2013
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

EXAMINER

SHAW, PELING ANDREW

ART UNIT PAPER NUMBER

2444

DATE MAILED: 07/24/2013

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.



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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

<b>Notice of Allowability</b>	<b>Application No.</b> 13/714,748	<b>Applicant(s)</b> PRYOR, TIMOTHY R.	
	<b>Examiner</b> PELING SHAW	<b>Art Unit</b> 2444	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 06/19/2013.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 21-50. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/oph/index.jsp](http://www.uspto.gov/patents/init_events/oph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All    b)  Some    \*c)  None of the:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |                                                                                                                            |                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                | 5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                  |
| 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>4/5/13</u> | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                 | 7. <input type="checkbox"/> Other _____.                                             |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.                                     |                                                                                      |

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**DETAILED ACTION**

1. This application has been examined. Specification changes received on 03/19/2013 are reviewed and accepted. Pre-amendment received on 06/19/2013 has been entered. Claims 1-20 are cancelled. Claims 21-50 are new. Claims 21-50 are currently pending.

***Priority***

2. This application is a continuation of 12700055 filed on 02/04/2010 which is a continuation of 10866191 filed on 06/14/2004 which is a continuation of 09433297 filed on 11/03/1999 which claims a priority from provisional application 60107652 filed on 11/09/1998. The filing date is 12/14/2012.

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*Examiner's Amendment*

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. The application has been amended against applicant submitted Abstract dated 12/14/2012 as follows:

**IN THE ABSTRACT**

A method for determining a gesture illuminated by a light source ~~enhancing a well being of a small child or baby~~ utilizes ~~at least one~~ the light source to provide illumination through a work volume above the light source. A ~~TV~~ camera is positioned to observe and determine the gesture performed in the work volume ~~ne or more points on the child or an object associated with the child.~~ Signals from the ~~TV~~ camera are outputted to a computer, which analyzes the output signals to ~~determine a position or movement of the child or child associated object.~~ The ~~determined position or movement is then compared to preprogrammed criteria in the computer to determine a correlation or importance, and thereby to provide data to the child.~~

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*Reasons for Allowance*

5. Claims 21-50 are allowed as claim set received on 06/19/2013.

The following is an examiner's statement of reasons for allowance:

The closest prior arts of record issued to Naoi et al. (US 5459793 A), Platzker et al. (US 5528263 A), Sellers (US 5864334 A) and Fukushima et al. (US 6346929 B1) fail to teach or suggest the limitation combination of "a computer implemented method comprising: providing a light source adapted to direct illumination through a work volume above the light source; providing a camera oriented to observe a gesture performed in the work volume, the camera being fixed relative to the light source; and determining, using the camera, the gesture performed in the work volume and illuminated by the light source" in combination with all the elements of each independent claim. Examiner has reviewed the cited references per IDS received on 04/05/2013. Examiner has searched in EAST, eDAN and Google prior arts on the limitation combination as recited in the currently claimed invention. Naoi, Platzker, Sellers and Fukushima are a combination of closest prior arts to the claimed invention as presented by Applicant. Each of Naoi, Platzker, Sellers and Fukushim touches upon specific elements as presented in the independent claims. However, it is not obvious to combine Naoi, Platzker, Sellers and Fukushim in formulating a reasonable rejection against the independent claim language as presented with the consideration of Applicant's written description. Independent claims 21, 31 and 41 are thus to be allowed.

The dependent claims further limit the independent claims and are considered allowable on the same basis as the independent claims as well as for the further limitations set forth. Any comments considered necessary by applicant must be submitted no later than the payment of the

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issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peling A. Shaw whose telephone number is (571) 272-7968. The examiner can normally be reached on M-F 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter-Anthony Pappas can be reached on (571) 272-7646. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peling A Shaw/  
Primary Examiner, Art Unit 2444

<b>Notice of References Cited</b>	Application/Control No. 13/714,748	Applicant(s)/Patent Under Reexamination PRYOR, TIMOTHY R.	
	Examiner PELING SHAW	Art Unit 2444	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
*	A	US-5,459,793 A	10-1995	Naoi et al.	382/165
*	B	US-5,528,263 A	06-1996	Platzker et al.	345/156
*	C	US-5,572,251 A	11-1996	Ogawa, Yasuji	348/207.99
*	D	US-5,616,078 A	04-1997	Oh, Ketsu	463/8
*	E	US-5,808,672 A	09-1998	Wakabayashi et al.	348/220.1
*	F	US-5,864,334 A	01-1999	Sellers, Charles A.	345/168
*	G	US-5,936,610 A	08-1999	Endo, Shozo	345/157
*	H	US-6,252,598 B1	06-2001	Segen, Jakub	715/863
*	I	US-6,346,929 B1	02-2002	Fukushima et al.	345/8
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**


*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



<b>Search Notes</b>  	<b>Application/Control No.</b>  13714748	<b>Applicant(s)/Patent Under Reexamination</b>  PRYOR, TIMOTHY R.
	<b>Examiner</b>  PELING SHAW	<b>Art Unit</b>  2444

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
PALM, eDAN and EAST search on inventors for related applications	2013/07/03	PAS
EAST text review on IDS items	2013/07/03	PAS
EAST and Google text search on claimed invention, particularly on independent claim language	2013/07/03	PAS
EAST text interference search on independent claim language	2013/07/03	PAS

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	Interference text search	2013/07/03	PAS

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Receipt date: 04/05/2013

13714748 - GAI: 2444

Doc code: IDS

4/5/2013 (11:10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13714748
	Filing Date		2012-12-14
	First Named Inventor	Timothy R. Pryor	
	Art Unit		2691
	Examiner Name		
	Attorney Docket Number		135873.152187-US

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	3909002		1974-09-30	Levy	
	2	4219847		1980-08-26	Pinkney et al	
	3	4339798		1982-07-13	Hedges et al	
	4	4631676		1986-12-23	Pugh	
	5	4791589		1988-12-13	Blazo et al	
	6	4843568		1989-06-27	Krueger et al	
	7	4908704		1990-03-13	Fujioka et al	/Peling Sha
	8	4988981		1991-01-29	Zimmerman et al	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13714748	13714748 - GAU: 2444
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	Attorney Docket Number		135873.152187-US	

	9	5008946		1991-04-16	Ando	
	10	5088928		1992-02-18	Chan	
	11	5227986		1993-07-13	Yokota et al	
	12	5249053		1998-09-28	Jain	
	13	5297061		1994-03-22	Dementhon et al	
	14	5365597		1994-11-15	Holeva	
	15	5376796		1994-12-27	Chan et al	
	16	5388059		1995-02-07	DeMenthon	
	17	5454043		1995-09-26	Freeman	
	18	5491507		1996-02-13	Umezawa et al	
	19	5534921		1996-07-09	Sawanobori	

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	20	5572251		1996-11-05	Ogawa	
	21	5581276		1996-12-03	Cipolla et al	
	22	5594469		1997-01-14	Freeman et al	
	23	5616078		1997-04-01	Oh	
	24	5624117		1997-04-29	Ohkubo et al	
	25	5781647		1998-07-14	Fishbine et al	
	26	5781650		1998-07-14	Lobo et al	
	27	5828770		1998-10-27	Leis et al	
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	29	5853327		1998-12-29	Gilboa	
	30	5878174		1999-03-02	Stewart et al	

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	Art Unit	2691		
	Examiner Name			
	Attorney Docket Number	135873.152187-US		

	31	5904484		1999-05-18	Burns	
	32	5926168		1999-07-20	Fan	
	33	5940126		1999-08-17	Kimura	
	34	5982352		1999-11-09	Pryor	
	35	5999840		1999-12-07	Grimson et al	
	36	6052132		2000-04-18	Christian et al	
	37	6098458		2000-08-08	French et al	
	38	6108033		2000-08-22	Ito et al	
	39	6148100		2000-11-14	Anderson et al	
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	41	6204852		2001-03-20	Kumar et al	

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	Art Unit		2691	
	Examiner Name			
	Attorney Docket Number		135873.152187-US	

	42	6252598		2001-06-26	Segen	
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	44	6346929		2002-02-12	Fukushima et al	
	45	6359647		2002-03-19	Sengupta et al	
	46	6363160		2002-03-26	Bradski et al	
	47	6373472		2002-04-16	Palalau et al	
	48	6442465		2002-08-27	Breed et al	
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	52	6663491		2003-12-16	Watabe et al	

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	First Named Inventor	Timothy R. Pryor		
	Art Unit	2691		
	Examiner Name			
	Attorney Docket Number	135873.152187-US		

	53	6750848		2004-06-15	Pryor	
	54	6775361		2004-08-10	Arai et al	
	55	6788336		2004-09-07	Silverbrook	
	56	6911972		2005-06-28	Brinjes	
	57	7489863		2009-02-10	Lee	

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	First Named Inventor	Timothy R. Pryor		
	Art Unit	2691		
	Examiner Name			
	Attorney Docket Number	135873.152187-US		

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
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**EXAMINER SIGNATURE**

Examiner Signature	/Peling Shaw/	Date Considered	06/26/2013
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



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	First Named Inventor	Timothy R. Pryor	
	Art Unit	2691	
	Examiner Name		
	Attorney Docket Number	135873.152187-US	

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Vito A. Ciaravino/	Date (YYYY-MM-DD)	2013-04-05
Name/Print	Vito A. Ciaravino	Registration Number	62749

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

**Privacy Act Statement**

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S42	2	("6750848").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/24 18:08
S44	0	("L5and(monitorsame(displayorvideo))").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/24 18:38
S43	11	(US-20070256105-\$ or US-20030200308-\$).did. or (US-5754227-\$ or US-5914660-\$ or US-6271752-\$ or US-5446934-\$ or US-5206733-\$ or US-5122952-\$ or US-6160986-\$ or US-5802220-\$ or US-6437820-\$).did.	US-PGPUB; USPAT	OR	ON	2013/06/24 18:38
S45	6	S43 and (monitor same (display or video))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/24 18:39
S46	4	S45 and @ad<"19981109"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/24 18:41
S47	11	((("4396945") or ("4988981") or ("5072294") or ("5459793"))).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/25 14:13
S48	96	((("3718116") or ("3831553") or ("3846826") or ("4309957") or ("4484179") or ("4542375") or ("4629319") or ("4668537") or ("4686374") or ("4891772") or ("4908670") or ("4988981") or ("5045843") or ("5168531") or ("5227985") or ("5232499") or ("5267004") or ("5297061") or ("5388059") or ("5454043") or ("5478423") or ("5528263") or ("5534062") or ("5581276") or ("5594540") or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/25 14:55

		("5616078") or ("5617312") or ("5709423") or ("5767842") or ("5808672") or ("5864334") or ("5936610") or ("5936615") or ("6043805") or ("6160899") or ("6191773") or ("6252598") or ("6265993") or ("6346929").PN.				
S51	79	(S47 or S48) and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/25 14:59
S52	44	((("4791589") or ("4908704") or ("5249053") or ("5365597") or ("5376796") or ("5534921") or ("5572251") or ("5781650") or ("5904484") or ("5999840") or ("6052132") or ("6108033") or ("6148100") or ("6160899") or ("6252598") or ("6346929") or ("6359647") or ("6363160") or ("6529617") or ("6663491") or ("6750848")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 13:44
S54	251	S53 or S52	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/26 13:45
S53	207	((("3846826") or ("3909002") or ("4014000") or ("4146924") or ("4199137") or ("4219847") or ("4305131") or ("4339798") or ("4375674") or ("4396945") or ("4416924") or ("4435835") or ("4475122") or ("4484179") or ("4542375") or ("4602280") or ("4613942") or ("4629319") or ("4631676") or ("4631847") or ("4654872") or ("4654949") or ("4672564") or ("4686374") or ("4687200") or ("4843568") or ("4988981") or ("5008946") or ("5072294") or ("5088928") or ("5148591") or ("5168531") or ("5227986") or ("5297061") or ("5325472") or ("5388059") or ("5454043") or ("5459793") or ("5491507") or ("5506682") or ("5521616") or ("5566283") or ("5581276") or ("5594469") or ("5616078") or ("5617312") or ("5624117") or ("5772522") or ("5781647") or ("5828770") or ("5845006") or ("5853327") or ("5870771") or ("5878174") or ("5889505") or ("5913727") or ("5926168") or ("5940126") or ("5966310") or ("5982352") or ("6005548") or ("6030290") or ("6043805") or ("6049327") or ("6057856") or ("6084979") or ("6097369") or ("6098458") or ("6147678") or ("6198485") or ("6198847") or ("6204852") or ("6342917") or ("6373472") or ("6430997") or ("6442465") or ("6453180") or ("6508709") or ("6597817") or ("6727887") or ("6775361") or ("6788336") or ("6911972") or ("6954906") or ("7489863")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 13:45

S57	79	(S55 or S56) and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/26 13:47
S56	96	((("3718116") or ("3831553") or ("3846826") or ("4309957") or ("4484179") or ("4542375") or ("4629319") or ("4668537") or ("4686374") or ("4891772") or ("4908670") or ("4988981") or ("5045843") or ("5168531") or ("5227985") or ("5232499") or ("5267004") or ("5297061") or ("5388059") or ("5454043") or ("5478423") or ("5528263") or ("5534062") or ("5581276") or ("5594540") or ("5616078") or ("5617312") or ("5709423") or ("5767842") or ("5808672") or ("5864334") or ("5936610") or ("5936615") or ("6043805") or ("6160899") or ("6191773") or ("6252598") or ("6265993") or ("6346929")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 13:47
S55	11	((("4396945") or ("4988981") or ("5072294") or ("5459793")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/26 13:47
S58	96	((("3718116") or ("3831553") or ("3846826") or ("4309957") or ("4484179") or ("4542375") or ("4629319") or ("4668537") or ("4686374") or ("4891772") or ("4908670") or ("4988981") or ("5045843") or ("5168531") or ("5227985") or ("5232499") or ("5267004") or ("5297061") or ("5388059") or ("5454043") or ("5478423") or ("5528263") or ("5534062") or ("5581276") or ("5594540") or ("5616078") or ("5617312") or ("5709423") or ("5767842") or ("5808672") or ("5864334") or ("5936610") or ("5936615") or ("6043805") or ("6160899") or ("6191773") or ("6252598") or ("6265993") or ("6346929")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/07/02 10:12
S64	210	S63 or (S61 and @ad<"19970822")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/02 11:06
S63	79	(S62 or S58) and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/02 11:06
S62	11	((("4396945") or ("4988981") or ("5072294") or ("5459793")).PN.	US-PGPUB; USPAT;	OR	OFF	2013/07/02 11:06

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S61	251	S60 or S59	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/02 11:06
S60	207	(("3846826") or ("3909002") or ("4014000") or ("4146924") or ("4199137") or ("4219847") or ("4305131") or ("4339798") or ("4375674") or ("4396945") or ("4416924") or ("4435835") or ("4475122") or ("4484179") or ("4542375") or ("4602280") or ("4613942") or ("4629319") or ("4631676") or ("4631847") or ("4654872") or ("4654949") or ("4672564") or ("4686374") or ("4687200") or ("4843568") or ("4988981") or ("5008946") or ("5072294") or ("5088928") or ("5148591") or ("5168531") or ("5227986") or ("5297061") or ("5325472") or ("5388059") or ("5454043") or ("5459793") or ("5491507") or ("5506682") or ("5521616") or ("5566283") or ("5581276") or ("5594469") or ("5616078") or ("5617312") or ("5624117") or ("5772522") or ("5781647") or ("5828770") or ("5845006") or ("5853327") or ("5870771") or ("5878174") or ("5889505") or ("5913727") or ("5926168") or ("5940126") or ("5966310") or ("5982352") or ("6005548") or ("6030290") or ("6043805") or ("6049327") or ("6057856") or ("6084979") or ("6097369") or ("6098458") or ("6147678") or ("6198485") or ("6198847") or ("6204852") or ("6342917") or ("6373472") or ("6430997") or ("6442465") or ("6453180") or ("6508709") or ("6597817") or ("6727887") or ("6775361") or ("6788336") or ("6911972") or ("6954906") or ("7489863")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/07/02 11:06
S59	44	(("4791589") or ("4908704") or ("5249053") or ("5365597") or ("5376796") or ("5534921") or ("5572251") or ("5781650") or ("5904484") or ("5999840") or ("6052132") or ("6108033") or ("6148100") or ("6160899") or ("6252598") or ("6346929") or ("6359647") or ("6363160") or ("6529617") or ("6663491") or ("6750848")).PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/07/02 11:06
S65	24	(US-20070256105-\$ or US-20030200308-\$).did. or (US-5754227-\$ or US-5914660-\$ or US-6271752-\$ or US-5446934-\$ or US-5206733-\$ or US-5122952-\$ or US-6160986-\$ or US-5802220-\$ or US-6437820-\$ or US-5616078-\$ or US-6346929-\$ or US-6252598-\$ or US-5936610-\$ or US-5864334-\$ or US-	US-PGPUB; USPAT	OR	ON	2013/07/03 16:09

		5808672-\$ or US-5767842-\$ or US-5617312-\$ or US-5594469-\$ or US-5572251-\$ or US-5528263-\$ or US-5459793-\$ or US-4396945-\$).did.				
S66	8	S65 and LED	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 16:10
L1	42292	(light or illumina\$3) same camera same (gesture or hand or movement)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:40
L2	8618	L1 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:41
L4	1278	L3 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:43
L3	7758	(light or illumina\$3) same camera same (gesture or hand or movement) same (observ\$5 or monitor\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:43
L5	1336	(light or illumina\$3) same camera same (gesture or hand or movement) same (observ\$5 or monitor\$3) same computer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:44
L7	131	L5 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:45
L6	1278	L4 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:45
L8	64	((light or illumina\$3) same camera same	US-PGPUB;	OR	ON	2013/07/03


		(gesture or hand or movement) same (observ\$5 or monitor\$3) same computer).clm.	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			17:46
L9	5	L8 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 17:47
L10	0	((light or illumina\$3) same camera same (gesture or hand or movement) same (observ\$5 or monitor\$3) same laptop).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 18:13
L12	1	L11 and @ad<"19970822"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 18:14
L11	180	(light or illumina\$3) same camera same (gesture or hand or movement) same (observ\$5 or monitor\$3) same laptop	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/03 18:14

**EAST Search History (Interference)**

&lt;This search history is empty&gt;

**7/3/2013 6:16:27 PM****C:\Users\pshaw\Documents\EAST\Workspaces\13714748.wsp**




<b>Issue Classification</b> 	<b>Application/Control No.</b> 13714748	<b>Applicant(s)/Patent Under Reexamination</b> PRYOR, TIMOTHY R.
	<b>Examiner</b> PELING SHAW	<b>Art Unit</b> 2444

CPC			Type	Version
Symbol				


CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		<b>Total Claims Allowed:</b>	
(Assistant Examiner)		30	
/PELING SHAW/ Primary Examiner. Art Unit 2444		O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)		21	3
(Date)		7/3/2013	(Date)

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13714748	<b>Applicant(s)/Patent Under Reexamination</b> PRYOR, TIMOTHY R.
	<b>Examiner</b> PELING SHAW	<b>Art Unit</b> 2444

US ORIGINAL CLASSIFICATION					INTERNATIONAL CLASSIFICATION														
CLASS		SUBCLASS			CLAIMED					NON-CLAIMED									
348		77			H	0	4	N	9 / 47 (2006.01.01)										
CROSS REFERENCE(S)					H	0	4	N	7 / 18 (2006.01.01)										
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																		
348	155																		

NONE		<b>Total Claims Allowed:</b>	
		30	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/PELING SHAW/ Primary Examiner. Art Unit 2444	7/3/2013	21	3
(Primary Examiner)	(Date)		

<b>Issue Classification</b> 	<b>Application/Control No.</b> 13714748	<b>Applicant(s)/Patent Under Reexamination</b> PRYOR, TIMOTHY R.
	<b>Examiner</b> PELING SHAW	<b>Art Unit</b> 2444

<input type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b>																<input type="checkbox"/> <b>CPA</b>		<input type="checkbox"/> <b>T.D.</b>		<input type="checkbox"/> <b>R.1.47</b>	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original						
1	21	17	37																		
2	22	18	38																		
3	23	19	39																		
4	24	20	40																		
5	25	21	41																		
6	26	22	42																		
7	27	23	43																		
8	28	24	44																		
9	29	25	45																		
10	30	26	46																		
11	31	27	47																		
12	32	28	48																		
13	33	29	49																		
14	34	30	50																		
15	35																				
16	36																				

NONE		<b>Total Claims Allowed:</b>	
		30	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/PELING SHAW/ Primary Examiner. Art Unit 2444	7/3/2013	21	3
(Primary Examiner)	(Date)		


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**BIB DATA SHEET**
**CONFIRMATION NO. 3254**

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
13/714,748	12/14/2012	345	2444	135873.152187-0001		
<b>APPLICANTS</b>						
Timothy R. Pryor, Sylvania, OH;						
<b>** CONTINUING DATA *****</b>						
This application is a CON of 12/700,055 02/04/2010 which is a CON of 10/866,191 06/14/2004 ABN which is a CON of 09/433,297 11/03/1999 PAT 6750848 which claims benefit of 60/107,652 11/09/1998						
<b>** FOREIGN APPLICATIONS *****</b>						
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY **</b> 01/14/2013						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Met after Allowance	<b>STATE OR COUNTRY</b>	<b>SHEETS DRAWINGS</b>	<b>TOTAL CLAIMS</b>	<b>INDEPENDENT CLAIMS</b>
Verified and /PELING ANDREW SHAW/ Examiner's Signature		Initials	OH	7	20	3
<b>ADDRESS</b>						
WARNER NORCROSS & JUDD LLP INTELLECTUAL PROPERTY GROUP 900 FIFTH THIRD CENTER 111 LYON STREET, N.W. GRAND RAPIDS, MI 49503-2487 UNITED STATES						
<b>TITLE</b>						
MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS						
<b>FILING FEE RECEIVED</b> 933	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit			

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

24335 7590 07/24/2013  
**WARNER NORCROSS & JUDD LLP**  
**INTELLECTUAL PROPERTY GROUP**  
 900 FIFTH THIRD CENTER  
 111 LYON STREET, N.W.  
 GRAND RAPIDS, MI 49503-2487

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/714,748	12/14/2012	Timothy R. Pryor	135873.152187-0001	3254

TITLE OF INVENTION: MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$890	\$300	\$0	\$1190	10/24/2013

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHAW, PELING ANDREW	2444	348-077000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,</p> <p>(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.</p> <p>1 <u>Warner Norcross &amp; Judd LLP</u></p> <p>2 _____</p> <p>3 _____</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

<p>4a. The following fee(s) are submitted:</p> <p><input checked="" type="checkbox"/> Issue Fee</p> <p><input checked="" type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input checked="" type="checkbox"/> Payment by <del>credit card. Form PTO-2038 is attached.</del> EFT</p> <p><input checked="" type="checkbox"/> The Director is hereby authorized to charge <del>the required fee(s)</del>, any deficiency, or credit any overpayment, to Deposit Account Number <u>230457</u> (enclose an extra copy of this form).</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

5. **Change in Entity Status** (from status indicated above)

- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Authorized Signature  /Vito A. Ciaravino/ Date  July 31, 2013

Typed or printed name  Vito A. Ciaravino Registration No.  62749

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13714748
<b>Filing Date:</b>	14-Dec-2012
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Attorney Docket Number:</b>	135873.152187-0001

Filed as Small Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl Issue Fee	2501	1	890	890
Publ. Fee- Early, Voluntary, or Normal	1504	1	300	300
IPR2022-00090 - LGE				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1190</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	16462835
<b>Application Number:</b>	13714748
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Filer Authorized By:</b>	Vito Anthony Ciaravino
<b>Attorney Docket Number:</b>	135873.152187-0001
<b>Receipt Date:</b>	01-AUG-2013
<b>Filing Date:</b>	14-DEC-2012
<b>Time Stamp:</b>	14:56:09
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	\$1190
RAM confirmation Number	1287
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part (.zip) (if appl.)	Pages (if appl.)

1	Issue Fee Payment (PTO-85B)	NOA_152187.pdf	1148704	no	2
			b3320bc882ea61cc6967f3b173ab3dc0a1e9080c		

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	31654	no	2
			ba0e534d5fccc61b5d28a55f6f871bc09aee de73		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			1180358		
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/714,748 12/14/2012 Timothy R. Pryor 135873.152187-0001 3254

24335 7590 08/22/2013
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Table with 1 column: EXAMINER

SHAW, PELING ANDREW

Table with 2 columns: ART UNIT, PAPER NUMBER

2444

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

08/22/2013 ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@wnj.com



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
www.uspto.gov

Application No. : 13714748  
Applicant : Pryor  
Filing Date : 12/14/2012  
Date Mailed : 08/22/2013

## NOTICE TO FILE CORRECTED APPLICATION PAPERS

### *Notice of Allowance Mailed*

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

**Applicant is given 1 month(s) from the mail date of this Notice, or the time remaining from the Notice of Allowance and Fee(s) Due, whichever is longer, within which to respond.**

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED. **This period for reply is NOT extendable under 37 CFR 1.136(a).**

See attachment(s).

*A copy of this notice **MUST** be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".*

/Kevin Danemark/  
Publication Branch  
Office of Data Management  
(571) 272-4200

**IDENTIFICATION OF APPLICATION DEFICIENCIES**

- Applicant must provide legible text for the following item(s).
  - Specification filed , page(s) .
  - Claims filed , claim(s) .
  - Oath/declaration filed .
  - Other: .
- Applicant must provide missing information on the following page(s) of the specification by amending the specification to add the missing text. No new matter may be added. 2 - line 2, provide missing patent number
- The specification refers to one or more applications by attorney docket number and does not show the U.S. application number(s). Applicant must supply the U.S. application number in place of each attorney docket number.
- Applicant must provide an Abstract of the Disclosure.
- Applicant has submitted a DECLARATION (37 CFR 1.63) FOR A UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76) (e.g., form PTO/SB/01A). The Application Data Sheet, however, is not present with the filed application. Applicant must submit an Application Data Sheet or file a new oath or declaration (e.g., PTO/SB/01) executed by the inventors and containing the information required in 37 CFR 1.63.
- Applicant must provide an executed declaration.
- Applicant must provide the missing page(s) of the oath/declaration or Application Data Sheet filed
- Applicant must provide a declaration signed by inventor(s) .
- The oath/declaration filed shows non-initialed and/or non-dated alterations. Applicant must file a new oath/declaration in compliance with 37 CFR 1.67(a).
- Applicant(s) in the latest-filed oath/declaration or Application Data Sheet (ADS) did not show the inventor's residence at all, or did not show both a city and state in the U.S. inventor's residence, or did not show both a city and country in the non-U.S. inventor's residence. Applicant must supply an oath/declaration or Application Data Sheet (ADS) that shows each U.S. inventor's city and state of residence and each non-U.S. inventor's city and country of residence.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor : Timothy R. Pryor  
App. No. : 13/714,748  
Filing Date : December 14, 2012  
For : MORE USEFUL MAN MACHINE INTERFACES AND  
APPLICATIONS  
Attorney Docket No. : 135873.152187-0001

Mail Stop Issue Fee  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Responsive to the Notice to File Corrected Application Papers mailed August 22, 2013, the period for reply being until September 22, 2013, please amend Paragraph 0001 of the Specification as set forth on the following page. In particular, Pgph. 0001 is amended to delete “now U.S. Patent \_\_\_\_\_”, because the corresponding application has not yet issued. No new matter has been added. It is respectfully submitted that the present application is fully in condition for issuance.

Respectfully submitted,

TIMOTHY R. PRYOR

By: Warner Norcross & Judd LLP

/Vito A. Ciaravino/

Vito A. Ciaravino  
Registration No. 62749  
900 Fifth Third Center  
111 Lyon Street, N.W.  
Grand Rapids, MI 49503-2487  
(616) 752-2709

Inventor : Timothy R. Pryor  
App. No. : 13/850,577

SPECIFICATION

Please replace Paragraph 0001 with the following Paragraph:

[0001] This application is a continuation of U.S. Patent Application No. 12/700,055, filed February 4, 2010 (~~now U.S. Patent \_\_\_\_\_~~), which is a continuation of U.S. Patent Application No. 10/866,191, filed June 14, 2004, which is a continuation of U.S. Patent Application No. 09/433,297, filed November 3, 1999 (now U.S. Patent 6,750,848), which claims benefit of U.S. Provisional Application No. 60/107,652, filed November 9, 1998. These applications are hereby incorporated by reference.

9403263



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/714,748 12/14/2012 Timothy R. Pryor 135873.152187-0001 3254

24335 7590 08/22/2013
WARNER NORCROSS & JUDD LLP
INTELLECTUAL PROPERTY GROUP
900 FIFTH THIRD CENTER
111 LYON STREET, N.W.
GRAND RAPIDS, MI 49503-2487

Table with 1 column: EXAMINER

SHAW, PELING ANDREW

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2444

Table with 2 columns: NOTIFICATION DATE, DELIVERY MODE

08/22/2013 ELECTRONIC

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patents@wnj.com





UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
www.uspto.gov

Application No. : 13714748  
Applicant : Pryor  
Filing Date : 12/14/2012  
Date Mailed : 08/22/2013

## NOTICE TO FILE CORRECTED APPLICATION PAPERS

### *Notice of Allowance Mailed*

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

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See attachment(s).

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/Kevin Danemark/  
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**IDENTIFICATION OF APPLICATION DEFICIENCIES**

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  - Claims filed , claim(s) .
  - Oath/declaration filed .
  - Other: .
- Applicant must provide missing information on the following page(s) of the specification by amending the specification to add the missing text. No new matter may be added. 2 - line 2, provide missing patent number
- The specification refers to one or more applications by attorney docket number and does not show the U.S. application number(s). Applicant must supply the U.S. application number in place of each attorney docket number.
- Applicant must provide an Abstract of the Disclosure.
- Applicant has submitted a DECLARATION (37 CFR 1.63) FOR A UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76) (e.g., form PTO/SB/01A). The Application Data Sheet, however, is not present with the filed application. Applicant must submit an Application Data Sheet or file a new oath or declaration (e.g., PTO/SB/01) executed by the inventors and containing the information required in 37 CFR 1.63.
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- Applicant must provide a declaration signed by inventor(s) .
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## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	16686763
<b>Application Number:</b>	13714748
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	3254
<b>Title of Invention:</b>	MORE USEFUL MAN MACHINE INTERFACES AND APPLICATIONS
<b>First Named Inventor/Applicant Name:</b>	Timothy R. Pryor
<b>Customer Number:</b>	24335
<b>Filer:</b>	Vito Anthony Ciaravino/Nancy Gravelin
<b>Filer Authorized By:</b>	Vito Anthony Ciaravino
<b>Attorney Docket Number:</b>	135873.152187-0001
<b>Receipt Date:</b>	26-AUG-2013
<b>Filing Date:</b>	14-DEC-2012
<b>Time Stamp:</b>	16:44:45
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Corrected_Application_Papers.pdf	319520 <small>d15f45d5f9534480656abac3bfaa739981ce7b2d</small>	no	5

### Warnings:

### Information:

IPR2022-00090 - LGE

Ex. 1002 - Page 191

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office  
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Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/714,748	12/14/2012	Timothy R. Pryor	135873.152187-0001	3254
24335	7590	08/30/2013	EXAMINER	
WARNER NORCROSS & JUDD LLP INTELLECTUAL PROPERTY GROUP 900 FIFTH THIRD CENTER 111 LYON STREET, N.W. GRAND RAPIDS, MI 49503-2487			SHAW, PELING ANDREW	
			ART UNIT	PAPER NUMBER
			2444	
			NOTIFICATION DATE	DELIVERY MODE
			08/30/2013	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@wnj.com

<b>Response to Rule 312 Communication</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	13/714,748	Timothy P.
	<b>Examiner</b>	<b>Art Unit</b>

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

1.  The amendment filed on 26 August 2013 under 37 CFR 1.312 has been considered, and has been:
- a)  entered.
  - b)  entered as directed to matters of form not affecting the scope of the invention.
  - c)  disapproved because the amendment was filed after the payment of the issue fee.  
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
  - d)  disapproved. See explanation below.
  - e)  entered in part. See explanation below.

B.Crittenden

**Publishing Division**



APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/714,748	10/08/2013	8553079	135873.152187-0001	3254

24335 7590 09/18/2013  
WARNER NORCROSS & JUDD LLP  
INTELLECTUAL PROPERTY GROUP  
900 FIFTH THIRD CENTER  
111 LYON STREET, N.W.  
GRAND RAPIDS, MI 49503-2487

### ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

#### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Timothy R. Pryor, Sylvania, OH;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
-----------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:21-cv-00040	DATE FILED 2/4/2021	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF Gesture Technology Partners, LLC		DEFENDANT Huawei Device Co., Ltd. and Huawei Device USA, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,194,924	6/5/2012	Gesture Technology Partners, LLC
2 7,933,431	4/26/2011	Gesture Technology Partners, LLC
3 8,878,949	11/4/2014	Gesture Technology Partners, LLC
4 8,553,079	10/8/2013	Gesture Technology Partners, LLC
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy



AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
-----------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:21-cv-00041	DATE FILED 2/4/2021	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF Gesture Technology Partners, LLC		DEFENDANT Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,194,924	6/5/2012	Gesture Technology Partners, LLC
2 7,933,431	4/26/2011	Gesture Technology Partners, LLC
3 8,878,949	11/4/2014	Gesture Technology Partners, LLC
4 8,553,079	10/8/2013	Gesture Technology Partners, LLC
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
--------------------

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

<b>TO: Mail Stop 8</b> <b>Director of the U.S. Patent and Trademark Office</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>	<b>REPORT ON THE</b> <b>FILING OR DETERMINATION OF AN</b> <b>ACTION REGARDING A PATENT OR</b> <b>TRADEMARK</b>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:21-cv-00121	DATE FILED 2/4/2021	U.S. DISTRICT COURT Western District of Texas
PLAINTIFF Gesture Technology Partners, LLC		DEFENDANT Apple Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,194,924	6/5/2012	Gesture Technology Partners, LLC
2 7,933,431	4/26/2011	Gesture Technology Partners, LLC
3 8,878,949	11/4/2014	Gesture Technology Partners, LLC
4 8,553,079	10/8/2013	Gesture Technology Partners, LLC
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
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DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:21-cv-00122	DATE FILED 2/4/2021	U.S. DISTRICT COURT Western District of Texas
PLAINTIFF Gesture Technology Partners, LLC		DEFENDANT Lenovo Group Ltd., Lenovo (United States) Inc., and Motorola Mobility LLC
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,194,924	6/5/2012	Gesture Technology Partners, LLC
2 7,933,431	4/26/2011	Gesture Technology Partners, LLC
3 8,878,949	11/4/2014	Gesture Technology Partners, LLC
4 8,553,079	10/8/2013	Gesture Technology Partners, LLC
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

<b>TO:</b> <p style="text-align: center;"><b>Mail Stop 8</b>  <b>Director of the U.S. Patent and Trademark Office</b>  <b>P.O. Box 1450</b>  <b>Alexandria, VA 22313-1450</b></p>	<p><b>REPORT ON THE          FILING OR DETERMINATION OF AN          ACTION REGARDING A PATENT OR          TRADEMARK</b></p>
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

Trademarks or  Patents. (  the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 6:21-cv-00123	DATE FILED 2/4/2021	U.S. DISTRICT COURT Western District of Texas
PLAINTIFF Gesture Technology Partners, LLC		DEFENDANT LG Electronics Inc. and LG Electronics U.S.A., Inc.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,194,924	6/5/2012	Gesture Technology Partners, LLC
2 7,933,431	4/26/2011	Gesture Technology Partners, LLC
3 8,878,949	11/4/2014	Gesture Technology Partners, LLC
4 8,553,079	10/8/2013	Gesture Technology Partners, LLC
5 7,804,530	9/28/2010	Gesture Technology Partners, LLC

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT
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CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director  
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy